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To: *The Medical and Surgical Profession:*

The Southeastern Surgical Congress will hold its annual assembly in Atlanta, Georgia, at the Atlanta Biltmore Hotel, March 10, 11, 12, 13, 1952. The meeting will be held in conjunction with the Atlanta Graduate Medical Assembly. The two beautiful auditoriums in the Atlanta Biltmore Hotel will have programs running concurrently during the entire meeting.

The Southeastern Surgical Congress extends to you a cordial invitation to attend this outstanding meeting.

Sincerely,

Jos. S. Stewart, M.D.
President, The Southeastern Surgical Congress

THYROIDECTOMY

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THE history of thyroidectomy or operation for goiter should be of great interest to those of us doing this type of surgery. The comparative ease and safety with which thyroidectomy is now performed may cause us to lose sight of the problems and dangers underlying the procedure. A review of the history of this operation adapted from Rienhoff[1] may serve as a reminder by pointing out the problems encountered and at times overcome by early operators.

The first operation for removal of goiter, according to Mandy, was performed by Albucasis who "knew very well how to control hemorrhage by ligature and the hot iron." This was done in Bagdad in the latter part of the tenth century. As early as 1701 Desault performed an operation which was the most bloodless and systematic of his time and the procedure was not improved upon until 1880. He was the first to ligate the superior and inferior arteries before cutting them, and to dissect the gland from the trachea. His operation is said to have been performed in a masterly manner and the patient recovered. Heister performed the operation several times in 1752 and described the procedure in detail in his Chirurgie. In 1770 Benjamin Gooch noted that "another skilled surgeon performed an extirpation of the thyroid gland, with the result that for several days and nights different people made pressure upon the neck to check the hemorrhage." Other successful operations had been done by 1800, but the most remarkable were those by Heidenus who without benefit of antisepsis or anesthetics removed six suffocating goiters without a death. Dupuytren in 1808 made the important contribution of doubly ligating arteries and cutting be-

tween the ligatures. His patient, however, succumbed to a severe and fatal reaction 35 hours later. Sir William Blizzard ligated the thyroid artery for the cure of goiter in 1811. His patient died, but three years later Phillip Von Walther repeated the procedure successfully.

The first case of exophthalmic goiter treated by ligation of a thyroid artery was apparently that of Key and Earle in 1824 and 1826. They performed ligations of the superior thyroid arteries on a patient suffering from goiter with exophthalmus, a livid countenance, nervousness, irritability, and headache. Their patient died two days later, but the case is of great interest because it was reported one year before Parry's case and 12 years before Graves' description of exophthalmic goiter.

The first extirpation of a goiter in America was done by Nathan R. Smith of Maryland in 1835. This was reported as being an enormous pendulous ulcerating goiter in which large veins could be seen over the surface of the gland. The vessels were first grasped with the fingers and then ligated. This patient recovered completely from the operation, which was reported as lasting for one hour, but died of sepsis on the thirteenth day. Paul Sick performed in 1867 a complete removal of the thyroid gland. This apparently was the first time this had been done. He then made the first observations on the signs and symptoms due to absence of the gland. His report included a description of the boy four months later and stated that where he had previously been lively and joyous, his physical behavior had changed and he was then silent and dull. This was thought to be due to chemical alteration of the blood stream to the brain, or to disturbed circulation to the brain. Vertical and oblique incisions had been used until 1880 when Boeckel introduced the transverse incision which was later popularized by Theodor Kocher and was then called by his name. Tillaux is given credit for discovering and demonstrating that exophthalmic goiter can be cured by operation; however, Rehn in 1884 and Mikulicz in 1886 independently rediscovered this fact.

Due to the lack of anesthesia the main object of surgeons up until the middle of the nineteenth century had been to remove the goiter with a minimal amount of hemorrhage and in the shortest possible time. This, of course, prevented the operator from working with much deliberation and shock and sepsis produced a high mortality. The absence of tetany and hypothyroidism in many of these cases was probably due to the fact that mass ligatures were used and it is probable that a comparatively large amount of gland was left in place and the posterior capsule was not disturbed, so that the parathyroids were left intact.

The greatest advances in technic came from the clinics of the Swiss, Austrians, and Germans where the number of cases available was practically unlimited. The discovery of anesthesia in America in 1842 and of antisepsis in Great Britain in 1867 gave a great impetus to all types of surgery. The introduction of artery forceps did away, to a great extent, with the fear of uncontrolled hemorrhage, but antisepsis was the greatest boon as most deaths had been the result of sepsis. The most important advances from 1878 to 1890 came from the clinics of the schools of Theodor Kocher in Bern and Theodorus Billroth in Vienna. Billroth noted that in total extirpation of the gland, damage was frequently done to the recurrent laryngeal nerves and he advocated less tissue in the ligatures in the region of these nerves. He also advised dividing the muscles transversely and ligating the vessels en masse, rather than dissecting them out. He felt that tetany, not an unusual complication at that time, was due to reflex irritation from nerve injury and his technic was modified to avoid even further the region of the nerves. This probably indirectly saved many parathyroids.

Theodor Kocher, who between 1875 and 1904 performed 3,000 operations for goiter, contributed more than any other surgeon to the operative treatment of goiter. In 1895 when he reported his first 1,000 cases, the mortality was 1 per cent for 900 cases and in only 1 case did tetany develop. Kocher used a transverse incision, did not cut the prethyroid muscles transversely, removed only one lobe routinely and always left the posterior capsule. The latter undoubtedly explained his low incidence of tetany. J. Von Mikulicz in 1866 published a series of cases in which he had performed resection and not extirpation of the thyroid gland. One of these cases had been bilateral. He had observed that total extirpation frequently resulted in cachexia strumiprivia (hypothyroidism) and tetany, as well as injury to the recurrent laryngeal nerve, and his operation was the result of logical deduction. He found that when a portion of the gland was left in the tracheo-esophageal angle these complications were rare.

In the early part of the twentieth century the main contributions to aseptic methods and refinements of technic came from the clinic of Halsted in America. In 1907 he published a technic stressing meticulous hemostasis, no muscle division except of the platysma, resection of only one lobe routinely, leaving enough tissue to protect the parathyroids and their circulation as well as the recurrent laryngeal nerves, the necessity of multiple stage operations in cases of hyperthyroidism; i.e., ligation of one or more thyroid arteries preceding resection of a lobe, and the performance of bilateral resections only in nontoxic goiters. Crile and C. H. Mayo somewhat

later employed the same type of operative procedure. To Crile must go the credit for the realization of the importance of eliminating preoperative apprehension and his plan of "stealing" a goiter is familiar to all.

The introduction by Plummer in 1923 of the use of iodine in the preoperative treatment of the patient with hyperthyroidism brought about some changes in thyroid surgery. It became possible because of the condition of the patient to perform many more bilateral resections with safety and fewer stage operations; i.e., pole ligations were done. There were still patients, however, whose toxic conditions could not be adequately controlled and while employed much less frequently, these procedures were not forgotten. With the introduction of thiouracil in 1943 by Astwood and later propylthiouracil, it would seem that any patient can be put in condition for thyroidectomy.

The technic of thyroidectomy developed by these pioneers has changed little in recent years. Pemberton and Black[2] in 1946 stated that the operation of subtotal thyroidectomy had remained substantially unchanged at the Mayo Clinic over a period of 25 to 30 years. A glance at *The Quarterly Cumulative Index Medicus* would reveal that there are few papers listed dealing with any major change in the technic of thyroidectomy. This, when compared with the numerous operations as suggested for hernia, would seem to show that the technic of thyroidectomy has stood the test of time.

While many of the problems which beset the early surgeons have been eliminated, we still have the following major problems to consider when doing a thyroidectomy:

1. Adequate control of hemorrhage.

2. Avoidance of injury to neighboring structures; i.e., the recurrent laryngeal nerves and the parathyroid glands.

3. Removal of the proper amount of tissue; i.e., enough tissue remaining to preserve adequate function, and enough removed to cure the underlying disease.

The technic which will be described in the following paragraphs is not original. It is the result of trial in our hands and also by profiting from the experience of others, both from their writings and from actually watching their work.

Preoperative treatment of the patient will not be given in detail here as we are dealing primarily with the operation itself. All our patients are given Lugol's solution for a period of approximately 10 days before operation. In toxic cases propylthiouracil is used where indicated. We have found that all patients can be brought

under adequate control by the proper use of this latter drug. In the immediate preoperative care our patients are given a grain and a half of nembutal on the night before operation to assure a peaceful night. On the morning of operation the patient is given a grain and a half of nembutal about an hour before the operation and this is followed by a hypodermic of the proper dose of morphine combined with 1/200 of a grain of hyoscine given about 45 minutes preoperatively. If the patient does not seem to be properly sedated before being taken to the operating room, or immediately upon arrival there, another grain and a half of nembutal is administered with holes being punched in the capsule to permit rapid absorption.

We feel that local anesthesia is the anesthetic of choice in thyroidectomy. We inject the skin with about 5 cc. of 2 per cent novocaine in the area marked for the skin incision. Following this the entire area above and below this line is infiltrated with a 1 per cent solution of novocaine. Care must be exercised when injecting the novocaine to be sure that the point of the needle does not enter a vein. After the tissues underlying the skin, in the area to be reflected, have been injected one can proceed with the operation. After the skin flaps have been elevated we frequently inject novocaine into the muscles before they are retracted laterally and further small injections of novocaine can be used if the patient complains of pain in any particular area. As will be seen in the patients to be reported later, additional anesthetics have been used in some cases. Some of these patients have received a basal dose of avertin as this was preferred by one of our surgeons. Others have received nitrous oxide or pentothal in addition to the local injection. This was done merely to quiet the apprehensive patient and the true anesthesia was not obtained from these drugs. Several of the cases later to be reported were done without the use of local anesthesia.

The incision used for thyroidectomy is of great importance, particularly because of the resultant scar. The scar should, of course, be as fine as possible and should be located so that it can be covered by a string of beads or other necklace worn by the patient. We make it a practice to place the patient on the table in the position in which the operation is to be performed. A line is then made with a sharp needle on the skin to indicate where the incision is to be made. This is done before the neck is prepared or the patient is draped. In this way the entire area of the neck can be seen and the relation of the scar to the contour of the neck can be seen without difficulty. While the location of the incision must be varied in each individual case to suit the contour of the neck, the scar usually lies approximately two fingerbreadths above the clavicles. With the neck extended the incision should extend practically straight

across the neck. The scar will later be found to have a slight concavity downward when the neck is brought into normal position.

After adequate preparation of the skin and draping, incision is made through the skin, subcutaneous tissue and platysma to the fascia. A rake retractor is then placed under the midportion of the upper flap and this flap is elevated by gentle dissection with gauze over the tip of the finger. This is carried upward at least as high as the thyroid notch. The lower flap is elevated in a similar manner down to the suprasternal notch. In elevating the lower flap it is usually found necessary to use a little sharp as well as blunt dissection. Spring retractors are then inserted under the edge of the skin at each end. The use of this type of retractor affords adequate exposure. A vertical incision is then made through the fascia, care being taken to avoid the anterior jugular veins. If these veins are cut, they should be occluded promptly to avoid the possibility of air embolism. The prethyroid muscles are divided vertically in the midline and retracted laterally, after being separated from the thyroid gland by blunt dissection. The capsule is stripped from the gland from the midline laterally. Both lobes are, as a rule, exposed and inspected or palpated so as to determine the extent of resection which will be needed on each side. The right lobe is as a rule removed first.

The use of a small cat's paw or rake retractor has been found to great advantage in rotating the lobe toward the midline. The first structure which should be cared for is probably the lateral thyroid vein. This is because it can easily be torn loose and cause troublesome bleeding. This vein is divided between forceps. The upper pole of the lobe is then exposed and the superior thyroid vessels are isolated. These are then divided between two forceps placed above and one below. Following this the line of incision into the gland laterally is decided upon and forceps are placed along this line. This tissue is divided. With the left index finger behind the capsule of the gland, the dissection is carried toward the midline. The index finger behind the capsule is of great value as any small nodules can be palpated and one is able to judge the amount of tissue being removed. When the dissection has been carried about half way to the trachea in this manner, the isthmus of the gland is divided down to the trachea and the division of the gland is carried out from the midpoint laterally. In this manner we are sure of leaving the tracheo-esophageal portion of the gland, or capsule, intact and thus avoid injury to the recurrent laryngeal nerves. We do not routinely expose the recurrent laryngeal nerves, but have on occasion when there is any apparent abnormality in the position or size of the gland. After resection of the gland all bleeding points are carefully

ligated with No. 000 chromic catgut suture. The superior thyroid artery is ligated with a suture ligature of catgut, the needle being placed through the tissue immediately behind the vessel. In this way one feels assured that the ligature will not slip off of the artery.

The opposite lobe is resected in a like manner and the pyramidal lobe, if it is present, is also resected. The amount of tissue remaining is judged by comparison with the size of a normal gland. In toxic cases an attempt is made to leave a portion of tissue about one-eighth to one-fourth the size of a normal gland. In other cases an attempt is made to remove all thyroid tissue which does not appear normal. When all bleeding has been controlled by ligatures, the patient is instructed to cough and any further bleeding points may be ligated. This is considered to be of great value and is an advantage of local anesthesia, as on occasion a vein is found to be open which does not bleed except with the increase in intrathoracic pressure produced by the cough. The sound of the voice, particularly after the first lobe has been resected, is also of value. With all bleeding controlled, drainage is then provided by one of two methods. In our earlier cases drainage was provided by using a small split Penrose drain, one limb of this being placed to each side of the midline and the drain being brought out between the muscles in the midline. More recently drainage has been done by making a small incision in the muscles laterally and introducing a narrow rubber drain through this opening on each side. The muscles and fascia are united in the midline with catgut sutures. Where midline drainage is used, the muscles are united above and below the drain. Where lateral drainage is used, the muscles are completely closed. It is found that a better result is obtained if this closure is done in two layers, the muscle fibers being united with interrupted sutures in one layer and the fascia in a second layer. The retractors are removed from the skin and the area beneath the skin flaps again inspected for any evidence of bleeding or oozing which is controlled if found. The skin is then closed around the drains with skin clips.

We have in the last year or two been using serature skin clips. This clip is removed by compressing the two metal prongs on the top of the clip. Removal is practically painless. These clips can also be used over and over. We have found that they will last through about five or six applications. Careful approximation of the skin edges while applying the clips is of great importance to provide a fine linear scar.

Sterile dressings are applied over the wound, a rather thick dressing being used. This dressing is then held in place by an Ace elastic bandage which is applied not too snugly. Due to an unfortunate accident some years ago in our clinic, we now keep our patients in a

room adjoining the operating suite for a period of thirty minutes to an hour following operation. This unfortunate accident was that of a patient who developed hemorrhage in the neck soon after reaching her room. By the time the nurse had summoned the surgeon to the room, the pressure of the bleeding in the neck had increased to such an extent that death resulted. Our patients are now carefully watched by a nurse for the above mentioned time and are usually seen by the surgeon before being returned to his or her bed.

The early removal of clips and the drain we feel is important in

TABLE I

	Female	Male	White	Colored
Cases	265	35	283	17
Per cent	88.3	11.7	94.3	5.7

Age distribution is shown in table II. It will be seen that the largest group of cases falls in the 30 to 39 age period where there are 78 cases. The youngest patient was a girl, aged 11, and the oldest a man, aged 72.

TABLE II

Age	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Cases	8	49	78	68	67	26	4

Table III shows the distribution as to diagnosis following the standard nomenclature. The heading "Others" includes thyroiditis, fetal adenomas, malignancies, and others. It will be noted that nodular toxic goiters made up the largest group in this series, comprising 52 per cent of the total.

TABLE III

Diagnosis	Cases	Per Cent
Diffuse Toxic	38	12.7
Diffuse Nontoxic	4	1.3
Nodular Toxic	156	52.0
Nodular Nontoxic	91	30.3
Others	11	3.7
Total	300	100.0

securing a fine linear scar. It is our practice to remove all skin clips and drains in 48 hours. On several occasions where a dressing was uncomfortable we have removed the clips and drains in 24 hours and have never seen any separation of the skin edges following this.

Three hundred consecutive cases following this technic are here reported. There was one death in this series, or mortality rate of 0.33 per cent.

As shown in table I, 265 or 88.3 per cent were females and 35 or 11.7 per cent males. 283 or 94.3 per cent were white and 17 or 5.7 per cent were colored.

Fourteen of these operations were second operations, and one was the third. Except for 2 cases the previous operations are not included in this series.

In 292 of these operations local anesthesia was used, of these 43 received additional anesthesia; i.e., avertin, nitrous oxide, or pentothal sodium. These supplementary agents were given only in small amounts to produce sedation rather than anesthesia. Four cases received ether alone and four cyclopropane alone.

All cases had the usual collar type of skin incision and in only 4 cases were the muscles cut transversely.

In 282 cases bilateral subtotal thyroidectomy was done, while in the remaining 18 only one lobe was disturbed. In all but one of these latter cases a single adenoma was removed. In one case operation was stopped after resection of the right lobe, because of the condition of the patient.

There were no injuries to the recurrent laryngeal nerves in this series and only one case of tetany. This latter was in a child aged 12 who had her second operation for diffuse goiter. Symptoms appeared after discharge from the hospital and cleared up promptly on appropriate medication.

One case developed postoperative hemorrhage 12 hours after the operation, necessitating reopening of the wound and ligating a vein. It was assumed that a ligature had slipped off, as the wound had remained dry before closure in spite of a vigorous cough. This patient had been operated upon under local anesthesia.

The one death in the series was in a female patient, aged 65, who had a toxic nodular goiter. This patient had had the usual preoperative preparation and was in satisfactory condition for operation. She went through the operation without any difficulty. About 10 hours following the operation the patient apparently went into circulatory collapse. Blood pressure dropped to 78/58, the pulse became weak and thready, and the patient showed evidence of shock. There was no evidence of hemorrhage from the wound. In spite of supportive measures she died within a short time. Autopsy was refused.

SUMMARY

1. A brief history of the development of the operation of thyroidectomy is presented.

2. The technic employed by the author and his associates is described.

3. A series of 300 consecutive cases following this technic is presented.

REFERENCES

1. Rienhoff, W. F., Jr.: Diseases of the Thyroid Gland, in Lewis' Practice of Surgery, Hagerstown, Md., W. F. Prior Co., Inc., 1948, vol. 6, chap. 1.
2. Pemberton, J.deJ., and Black, B. M.: Some technical aspects of surgery of thyroid gland, S. Clin. North America 26:909 (Aug.) 1946.

CLINICAL ASPECTS OF THE ECTOPIC URETER

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THE subject of congenital abnormalities has always been most intriguing and too often they are discovered only as a cause of infant mortality or later in life as an autopsy finding. Anomalies of the urinary tract are quite common, often present themselves later in life and more important still can be ofttimes corrected. Polycystic kidney disease, a congenital anomaly, comes to our attention usually between the ages of 30 and 50 years, and when it is discovered early enough, life can be prolonged indefinitely.

My subject is the ectopic or misplaced ureter, the symptoms of which are usually presented first to the pediatrician, general practitioner or general surgeon. The large volume of literature which has been published on this subject shows this anomaly to be quite common and I shall not try to cover the embryology or list the reported publications. Abeshouse[1] covered the embryology and reviewed the literature in 1943. The illustrative cases I am reporting were diagnosed in a four month period and again show how important a complete examination must be and how even the unusual must be considered in our investigations.

CASE REPORTS

CASE 1. A 9 year old female reported to an outpatient clinic as a bed wetter. She voided normally during the day, did not get up at night, and had no frequency or urgency of urination. The urine was negative, bladder capacity normal, and she was placed on accepted therapy for nocturnal incontinence without a complete examination, with no improvement. She was then seen by one of my associates, who determined that her clothing was wet during the day as well as at night. Intravenous urograms showed a large normal kidney on the left and no appearance of the dye on the right (fig. 1). No ureteral orifice could be found in the bladder on the right. The vaginal vault seemed wet and finally a tiny opening was found in the deep vaginal vault on the right side. This opening was catheterized with much difficulty. The right pyelogram showed an aplastic type of kidney (fig. 2), secreting just enough to keep the child wet. A right nephrectomy cured the patient. Of course, a proper history and examination in the beginning would have immediately given the answer.

CASE 2. A female aged 18 months was admitted to the surgical service with acute onset of abdominal pain, localizing over the right lower quadrant, and with a tender mass in that area. Fever and leukocytosis were present. The urine was negative. A diagnosis of acute appendicitis with rupture was made and the abdomen opened. The appendix was found normal, but a fluc-
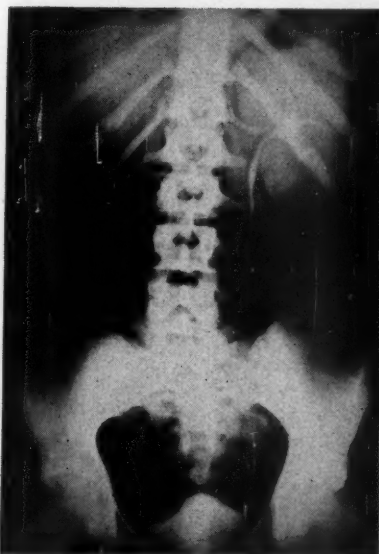
Fig. 1. Intravenous urogram showing
normal left kidney and no appearance
of dye on the right.

Fig. 2. Pyelogram through a vaginal
opening on right. Aplastic kidney se-
creting just enough to keep patient wet.

Fig. 3. Intravenous urogram showing
slight hydronephrosis on the right.

Fig. 4. Specimen removed showing
large ectopic ureter which emptied into
vaginal vault.

tuating retroperitoneal mass was found, from which purulent secretion was aspirated. The abdomen was then closed and the case referred to us.

Cystoscopy showed a normal bladder and ureters in normal position. Specimens from both kidneys were clear. Function was somewhat reduced on the right; a right pyelogram showed the kidney to be rather low and the upper calyces slightly compressed. Intravenous urograms gave no further information (fig. 3).

The mother then advised us that for some months the child complained at times with "tummy ache," following which she had noted a little vaginal discharge. The abdomen was reopened, and a large ectopic ureter about 2 inches in diameter was found, emptying into a small opening in the vagina. When the whole mass including the kidney was freed, the ectopic ureter was closely adherent to the normal one and led to the upper pole of a double kidney (fig. 4). Both ureters and the kidney were removed with complete recovery of the patient.

CASE 3. A 34 year old married female with one child was referred to us for low backache, recurrent vaginal discharge, attacks of fever and pyuria. She gave a history of having been in poor health most of her life. She had had many attacks of influenza during her childhood days.

Examination revealed a marked vaginal discharge with trichomonas vaginitis. The pelvis was negative. Catheterized specimen of urine was free from infection (other examined specimens had not been catheterized).

A complete cystoscopic survey showed only a bilateral renal ptosis. Bilateral normal pyelograms are shown (fig. 5). The blood counts were within normal
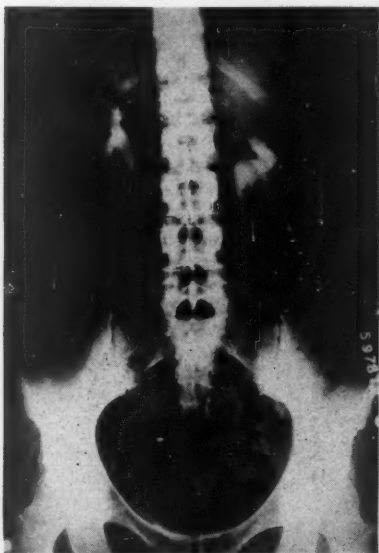

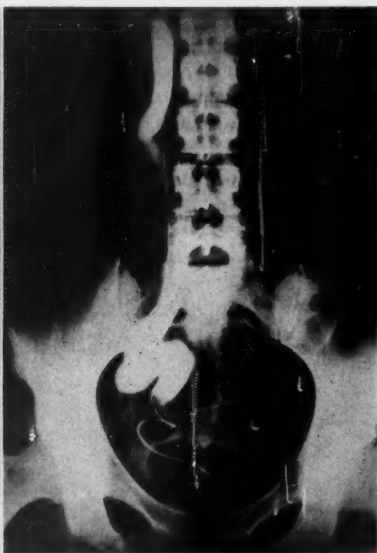Fig. 5. Bilateral pyelograms within normal limits.

Fig. 6. Ureterogram injected from a vaginal opening on the left of the cervix.

Fig. 7. Normal pyelogram on the left demonstrating the ectopic ureter.

Fig. 8. Ectopic ureter removed through a combined kidney and Gibson incision.

limits, and the agglutination blood studies were all negative: the recurrent fever was not explained. She was treated symptomatically and observed over a period of time with no change in the clinical picture. The vaginal infection would clear up under treatment and then recur, usually with low grade fever. An ectopic ureter or vaginal fistula was suspected. Intravenous urograms and a "vaginogram" were negative. We looked repeatedly for a vaginal opening but could not find one. Finally, the vaginal opening was found and catheterized. An ectopic ureter on the left going to the upper pole of the kidney was demonstrated (fig. 6). The ureter itself was about 2 inches in diameter, very tortuous and the trichomonas was found in the pus from this ureter. Figure 7 shows both the normal ureter and ectopic ureter on the same side injected.

At operation a double kidney was found and the much dilated ectopic ureter arising from the upper pole. A partial nephrectomy was done and the ectopic ureter removed, similar to our old aseptic nephroureterectomy for tuberculosis. The lower ureter including a section of the vagina was removed through a Gibson incision (fig. 8). The lower portion of the kidney with its normal ureter was not removed but, in doing this extensive dissection, there was damage to the blood supply and a later study showed that the lower kidney had gone on to autonomic nephrectomy. However, the patient has had a complete recovery from a condition which had given her recurrent toxemia all of her life.

CASE 4. A 19 year old female was referred to us for pain in her left side and back, urinary frequency and high fever. She had been operated upon three weeks before, at which time an ovarian cyst, the size of a grapefruit had been removed. The urine at the time of this operation had been reported negative.

Fig. 9. Normal pyelogram right and a
pyelogram showing lower pole of left
kidney.

Fig. 10. Intravenous urogram showing
double kidney on left.

Fig. 11. Intravenous urogram showing
lower dilated ureter on left.

Fig. 12. Specimen removed showing
double kidney. Normal ureter has been
detached from pouch where both ureters
opened.

On examination, the temperature was 103 F., with pain and tenderness in left abdomen, extending into the back. The urine was badly infected and the pelvic examination was negative.

On cystoscopic examination there was a marked bulging of the region of the left ureteral orifice, as one often finds in an impacted stone. The left ureteral orifice was found at the upper part of this bulge and was catheterized with no obstruction. The right ureteral orifice was normal and catheterized. No infection was found from either kidney, but the function was very low on the left. The pyelogram showed a cutting off of the upper calyces and we felt sure we were dealing with a double kidney (fig. 9). A second cystoscopy failed to reveal a second opening on the left, but the same bulging was present. Intravenous urograms finally helped us. A double left kidney with a widely dilated ureter going from the upper pole to the region of the bladder was demonstrated and a spot film of the lower ureter after 30 minutes showed a wide ureter in the region of the bladder (figs. 10 and 11). A nephroureterectomy was done and a most unusual condition found at the ureterovesical junction (fig. 12). The ectopic ureter emptied into a pouch in the bladder wall which was connected with the normal ureter. The lower kidney was not infected and the upper one very much so. The patient had a complete recovery but, as yet, I am not able to explain why the removal of an ovarian cyst seemed to "set off" this urological picture.

COMMENTS

I think it is probable that ectopic ureters are more common than statistics show. In all of these cases the ectopic ureter came from the upper pole of a double kidney except the one single aplastic kidney on the right. The diagnosis is often difficult, taking much time and ingenuity in trying to find the opening. Intravenous urograms usually do not help because of the poor function of this portion of the kidney.

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THE EFFECT OF PROSTATECTOMY ON HYPERTENSION

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THE role played by bladder neck obstruction as a causative factor in systemic elevation of the blood pressure has been studied for over 30 years.

This is a report on 321 patients who had prostatectomy performed upon them with special attention to their rise and fall of systemic blood pressure. The type of operation employed in 276 cases was transurethral resection; 35 were done suprapubicly, 8 by the retropubic route, and 2 were radical perineal prostatectomies for cancer. The method employed was the daily recording of blood pressures on two blood pressure sheets, starting on the date of admission before catheterization, and continuing until the day of discharge; and in available cases which could be followed in clinic or office, a further blood pressure record was kept.

Other factors recorded were the ages of the patients, the amount of residual urine in the bladder on admission, whether patients had generalized arteriosclerosis or diabetes, and the type of prostatectomy performed.

The fall in blood pressure due to bed rest and the optimum conditions afforded by hospitalization was taken into account.

See illustrations of blood pressure records, figures 1 through 5, 2 cases each.

It will be noticed that the decrease in pressures was most marked in the first four to five days following catheterization. Some cases show a rise, and then a gradual fall, or leveling off until the day of discharge. Note that after operation, the rate and degree of fall in pressure is not as great as that following the release of residual urine by the insertion of an indwelling catheter. No difference was seen in effect on blood pressure of suprapubic cystostomy drainage as compared to inlying urethral catheter drainage.

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The patients having the greatest fall were noticed to be those carrying 500 cc. or more residual urine. The age of the patient did not seem to appreciably affect the drop, but a greater fall was noticed in the very high pressure group.

Fig. 1

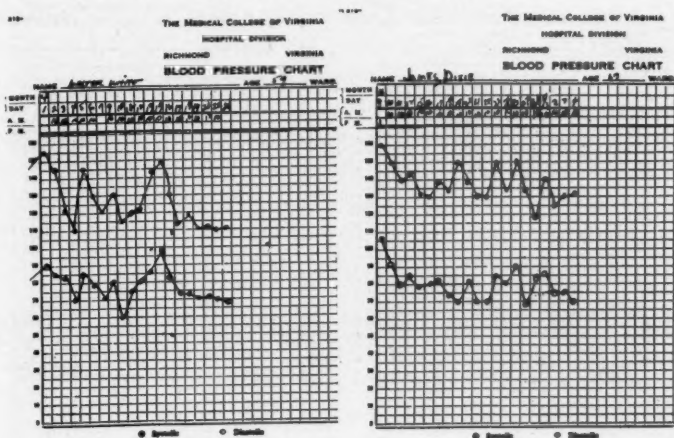Since patients with diabetes mellitus sometimes have hypotonic bladders, and carry residual urine with a minimal bladder neck ob-
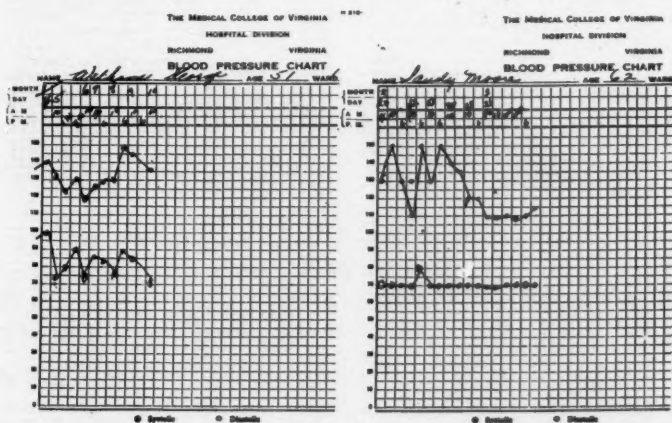

Fig. 2

struction, these were analyzed separately. Of the 321 patients, 15 had mild to severe diabetes and had an average drop in systolic pressure after operation of 42 mm. Hg and a fall of 18 mm. Hg., diastolic. The greatest fall in this group was a 62 year old man,

who also had generalized arteriosclerosis; his systolic fall was 70 mm. Hg. and diastolic fall was 50 mm. Hg.

Fig. 3
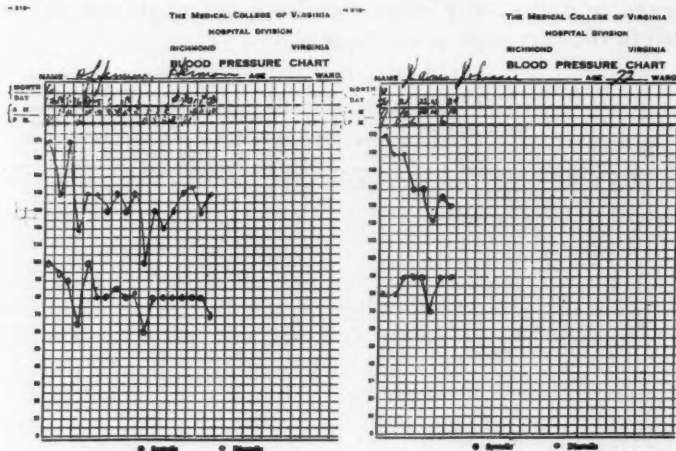
A second group was diagnosed as having generalized arteriosclerosis, numbering 47 patients out of the 321. The average systolic drop in this group was 38 mm. Hg., and the diastolic fall was
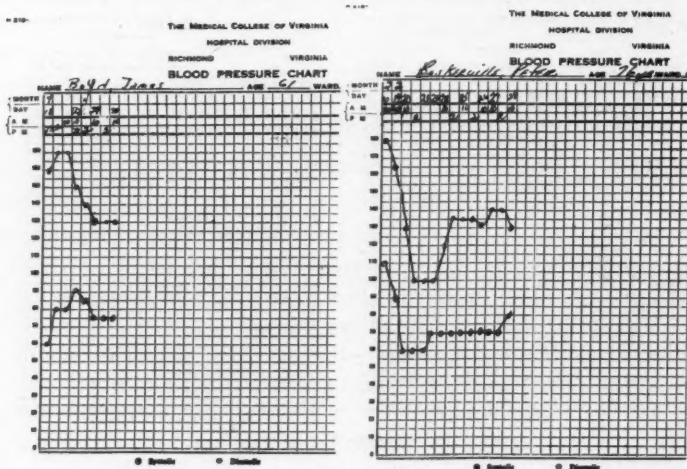

Fig. 4

17 mm. Hg. In these 47 patients, the range of fall was from 2 mm. to 80 mm. Hg. systolic, and diastolic 0 mm. Hg. to 40 mm. Hg. Five of these patients had a rise of from 5 to 46 mm. Hg. systolic,

and rise of from 4 to 20 mm. Hg., diastolic. This observation cannot be explained.

There was an over-all average systolic fall in the 321 patients of 33 mm. Hg. and a diastolic fall of 14 mm. Hg. Eighty per cent of the patients had a fall in pressure. Twenty per cent had a slight rise, or no change.

O'Conor[6] stated in 1920 that 35 per cent of his cases showing a definite hypertension maintained a return to normal pressure following operation in the one to two years in which he observed them. Therefore, he concluded that obstruction at the bladder neck must be considered as one of the causes of elevated systemic blood pressure.
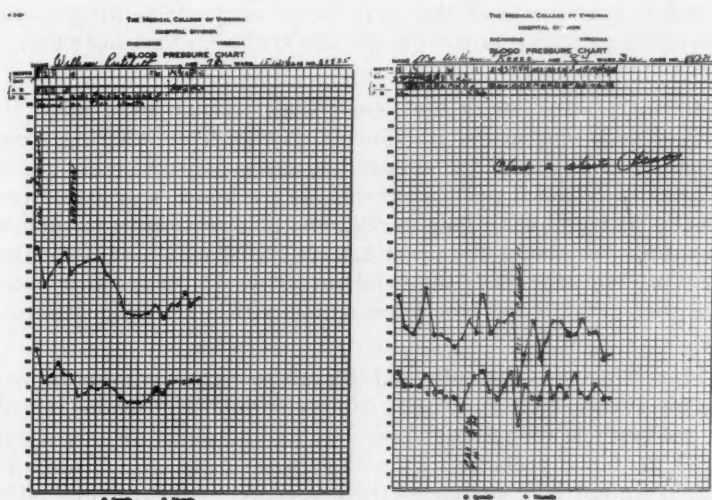
Fig. 5

Campbell[3] advanced the theory that hypertension occurs in a small group of prostatic patients because of inability of the upper tract to dilate, because they have intrarenal pelves.

Seng,[9] in a report on 514 patients, in 1931, did not notice a marked fall in the diastolic blood pressure of arteriosclerotic patients. This, he thought, was due to the rigidity of the vascular tree.

Goldblatt and his associates were the first to produce hypertension by reducing the blood flow through the kidney. They used a specially devised adjustable silver clamp. They showed that ischemia of one kidney caused a moderate elevation of blood pressure after three to four days, but returned to normal in a month or so, provid-

ing the opposite kidney remained intact and unaffected. Ischemia of both kidneys or of a solitary kidney consistently produced a permanent hypertension. It has been definitely established that this renal hypertension is caused by a vasoconstrictor substance produced in the ischemic organ.

In long-standing cases of pyelonephritis and glomerulonephritis, changes in the kidney occur which interfere with the renal circulation from within, thereby producing systemic hypertension.

It is therefore reasonable to suppose that, since we know some patients who carry residual urine eventually suffer a low grade pyelonephritis, with subsequent diminution of renal circulation, and a decrease of renal function as noted by the reduced phenolsulfon-phthalein excretion and the increase of nonprotein-nitrogen, the underlying causative factor for the elevated blood pressure here is at the bladder neck.

Another factor which may cause hypertension, even after the bladder neck obstruction is removed, is the dense scarring which occurs in the perirenal fat surrounding the kidney and renal vessels in cases of bilateral pyelonephritis. As we know, scar tissue continually contracts for a long period, and it is reasonable to suppose that it may compress the renal artery, giving us a slow Goldblatt effect or, by compressing the renal parenchyma, it may slowly interfere with renal blood flow from within with a resulting hypertension.

Hypertension is a deadly and difficult to treat condition in most instances; therefore, in all cases which come to our attention, should we not first test for residual urine? If we find some, then we should see if the blood pressure falls with catheter drainage. If not, then should we not look for upper tract infection or obstruction? This procedure could be followed in females since we see a few who have hypotonic bladders and carry residual urine, or who have median bar bladder neck obstruction, and many more who have pyelograms showing bilateral pyelonephritis.

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PROBLEMS IN ANESTHESIA OF SPECIAL INTEREST
TO THE SURGEON

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A NESTHESIA in surgery was introduced a little over 100 years ago and has since been hailed as America's greatest gift to mankind. The employment of anesthesia in surgery spread quickly over the entire civilized world. The idea of painless surgery lifted a cloud that had hitherto been hanging over the surgeons and very shortly the scope and number of surgical operations increased tremendously. This sense of emancipation from pain resulted for many years in the acceptance of nitrous oxide, ether, chloroform, and some forms of local as the ultimate in anesthetic art. Very few physicians were actively interested in anesthesia and the role of anesthetist was usually delegated to either a trained nurse or a first year surgical interne.

However, during the past 20 years, we find that an increasing number of physicians have become interested in anesthesia as a specialty. Many became interested in the quest for safer and more pleasant anesthetic agents, while others sought better methods of administration of the agents in use. At the same time, physiologists and chemists were likewise making new discoveries in the fields of respiration and circulation. A progressive era in anesthesia was born and, as a result, the mortality rate has decreased, the induction of anesthesia and the postoperative recovery period has been made more pleasant for our patients, and postoperative complications are much less frequent than in former years. The growth of lung and cardiac surgery has been the direct result of the progress in anesthesia, an economic fact which should be appreciated by the surgical profession, for during this period of time operative procedures for empyema, pelvic inflammatory disease, mastoiditis and tuberculous glands have been practically eliminated from our schedules.

Anesthesiology is now a recognized surgical specialty and in large hospitals it has come to assume the responsibility for preoperative preparation and postoperative care of the surgical patient in addition to the actual administration of the anesthetic and the care of the patient in the operating room.

There is one problem in preoperative preparation that I would

like to emphasize. To many of you it will not be new, but too often one either fails to recognize the entity or neglects to take the proper preoperative precautions. I refer particularly to the candidate for surgery who gives a history of weight loss during the preceding months. Whether the loss in weight has been the result of disease or the result of planned reduction in weight by diet makes little difference. The status of the physiologic hazard is the same. In such an individual there have been inaugurated some essential features predisposing to the development of shock.

An understanding of the factors concerned in the maintenance of the normal blood pressure is quite essential (table 1). Briefly, they are:

1. The efficiency of the heart which starts the flow of blood through the circulatory system.

2. A normal volume of blood in the system.

3. The prevention of a potential increase of space inside the circulatory system itself by the opening of more capillaries, arterioles and venules than normal or by loss in tone of the larger vessels.

4. The maintenance of the normal exchange of fluids between the blood and the body tissues.

5. The prevention of stagnation and lessening of normal venous return to the heart.

TABLE 1
Factors of Concern in Maintenance of Normal Blood Pressure

a. Efficiency of Heart.
b. Normal Circulating Blood Volume.
c. Normal Space Potential in the Vascular System.
d. Normal Exchange of Fluids.
e. Prevention of Stagnation and Preservation of Normal Venous Return to the Heart.

Let us briefly examine the pathologic status of the patient who has suffered recent loss of weight with regard to the above noted factors (table 2). First, in regard to the heart itself, any change should be a reflection of the cause of the weight loss. If it is the result of a reducing diet, then there should be some slight improvement in the cardiac condition. The cardiac muscle should show some beneficial effect of the decreased amount of work. However, if the loss is due to malignancy or some chronic wasting and toxic disease, one cannot assume that the cardiac muscle is less affected by this condition than are the other muscles of the body. Second, blood

volume determinations will show a definite decrease in proportion to
the amount of weight lost. Physiologic experiments have shown that
there is always a definite ratio between the blood volume, body sur-
face and body weight. They have also revealed an amazing con-
stancy over a period of several months of blood volume in the nor-
mal individual. The third factor is the space in the circulatory sys-
tem. Physiologists have well demonstrated that the space potential
in a normal individual is considerably greater than the actual. Under
normal conditions only a part of the vascular bed is open for the
passage of plasma and cells. In an individual with weight loss,
there has been no actual loss or elimination of the vascular channels
but, in order to maintain a normal pressure with a decreased blood
volume, a greater percentage must remain closed during a given
period of time. The important point is that the actual space poten-
tial has remained the same as it was before the loss in weight.

TABLE 2

Weight Loss as it Affects Factors Concerned with Prevention of Shock

a. Efficiency of Heart Muscle.
   1. Improved with Reducing Diet.
   2. Decreased in Cachectic States.
b. Blood Volume Decreased.
c. Same Space Potential.
d. Alteration of Fluid Balance with
   Increase of Interstitial Fluid.
e. Stage Set for Stagnation and Decreased
   Venous Return.

Fourth, there has been an alteration of the control of the exchange
of fluids between the blood and the body tissues. The normal ratio
of plasma volume to interstitial fluid volume is 1 to 3. In some
cases of weight loss this ratio has been found to be as high as 1 to 6.
Along with the reduction in plasma volume, there has been an in-
crease in interstitial fluid volume. In weight loss there is a lowering
of the tissue proteins and a lowering of the total mass of blood
proteins but the concentration of blood proteins remains essentially
the same. The exact mechanism whereby these changes are pro-
duced is admittedly complex. Fifth, due to the increase in vascular
space potential, if for any reason any additional vasodilatation
should take place, there would be a lowering of arterial and venous
pressure and a slowing of the transmission of blood through the
vascular bed.

In this type of illness, one very often discovers that the usual lab-
oratory examinations such as hemoglobin, hematocrit and red cell
count are essentially normal in value. These examinations are time-

honored indices of the status of the vascular system, but they may give us a false sense of security.

Surgery on such a patient without adequate preoperative restoration to a normal blood volume is fraught with danger to the very existence of the individual. The vascular controls are already severely taxed in the maintenance of a normal blood pressure. With the vasodilatation that takes place with the induction of general anesthesia or with spinal anesthesia, one may find a patient with a dangerously low pressure before the operation has even begun. Suitable therapy may restore the pressure to normal level only to have it again recur during the operation as a result of only a moderate loss of blood. Many abdominal operations result in a blood loss varying from 500 cc. up to as much as 1500 cc. In spite of liberal transfusions during the operation, shock may occur on the table or during the postoperative period. An irreversible point may be reached so that the patient inevitably succumbs.

The blame for these operative casualties can be placed squarely upon improper preoperative preparation of the patient by transfusion of whole blood to restore the blood volume. Experimental blood volume determinations for various disease groups, expressed as per cent of standard for usual weight, is as follows: malignancy, 72 per cent; chronic infection, 76 per cent; hepatic disease, 67 per cent; peptic ulceration, 79 per cent (table 3). There are various

TABLE 3

Blood Volume in Diseases Associated with Weight Loss

Disease	No. of Cases	Weight Per cent of standard for usual weight	Blood Vol.
Malignancy	41	83%	72%
Chronic Infection	28	87%	76%
Hepatic Disease	8	84%	67%
Malnutrition	7	78%	76%
Peptic Ulcer	5	85%	79%
(From Clark, et al.)			

methods for the determination of blood volume, two of which, the Evans blue azo dye method and one involving the use of radioactive isotopes of iron, are most commonly used (table 4). However, they are time-consuming and well trained laboratory personnel are a necessity. By the correlation of a few simple facts we can estimate, at the patient's bedside, the approximate amount of blood necessary before operation. The ratio of blood volume to body weight is 80 to 90 cc. of blood per kilo of body weight. Clinical experience has shown that the preoperative administration of 50 cc. of blood for

each pound lost in body weight furnishes adequate replacement of the blood volume. Transfusion is advised in any patient of this type that has a weight loss in excess of six pounds. One should not give over 1000 cc. in any 24 hour period. In some individuals with a large loss of weight, the amount of blood necessary may be difficult to obtain, but experiments have shown that the approximate calculated amount is necessary to restore the blood volume to its normal standard.

TABLE 4

Estimation of Blood Required by Evans Dye Method and Weight Loss Formula

Diagnosis of Disease of Patient	Pints of Blood Required	
	Evans Blue	Weight Loss
Carcinoma of Colon	2	3
Carcinoma of Ileum (Metastases)	4	4
Carcinoma of Lung	1	2
Carcinoma of Stomach	5	5
Duodenal Ulcer	3	3
Gastric Ulcer (L. S. Mann)	2	2

Pathology causing loss of weight is usually associated with individuals past middle age. Statistics show this problem is of more concern today than it was 10 years ago and why it will become of increasing importance in years to come. As a result of decreased infant mortality, better nutrition, better housing, more preventive medicine, better industrial hygiene and improved medical and surgical care, the expectancy of life has increased from 49 years in 1900 to 68 years in 1950. Statistics recently issued by the Bureau of Census show a remarkable percentage gain of the upper age groups. The age group of 45 to 64 has increased from 13.5 per cent in 1900 to 20 per cent in 1950 (table 5). The most striking rise, however, is in the age group of 65 and over, which has doubled, rising from 4 per cent to 8 per cent of the total population. On the basis of the present percentage rise of the upper age group, one authority has estimated that the number of people above 60 years of age, which at present is about 17 million, will rise to a figure of 31 million by 1980. We can now appreciate why this problem will become of increasing importance in years to come.

Another very important problem is the control of respiration in the patient under general anesthesia. In common use today in anesthesia are agents which result in varying degrees of respiratory depression, such as pentothal sodium, cyclopropane and curare. Maintenance of adequate respiratory exchange is, without doubt,

one of the most important factors in safe general anesthesia. Modern physiologic concepts and theories in regard to respiration are too complex and too confusing to consider here. Experiments with oxygen therapy in certain individuals have added to the complexity of the situation. With our oxygen-rich gaseous mixtures, depressed respiratory exchange may be sufficient to adequately supply the necessary oxygen to the patient but it may be entirely inadequate for the elimination of carbon dioxide from the system, and moderate ex-

TABLE 5

Change in Age Groups 1900–1950 Expressed in Percentage of Whole Population
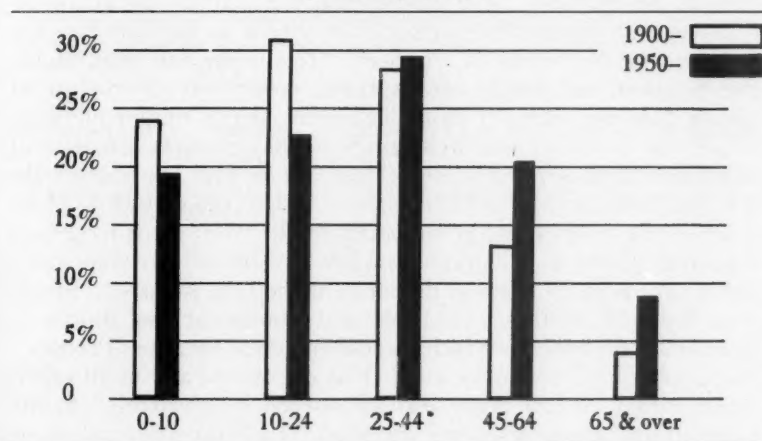
cess may be impossible to diagnose. Mousel states that percentages of carbon dioxide as high as 2 per cent are often impossible to detect by clinical observation of the patient's tidal volume, respiratory rate, pulse and blood pressure changes. This is especially true under deep anesthesia. Manual reinforcement of each respiration by rhythmic intermittent pressure on the rebreathing bag of a closed system will correct this impairment of respiratory exchange. If you have obtained good relaxation of the abdominal muscles, you may be certain that, at the same time, the adequacy of respiratory exchange is insufficient and manual supplementation is necessary. Since nitrous oxide and ethylene do not depress the respiratory center as regards its stimulation by carbon dioxide to any great extent, the use of supplemental respiration may not always be necessary when these agents are used.

In the use of muscle-relaxing agents in general anesthesia, one of the problems of importance is the timing of the last dose of the

agent. Just as the eye and facial muscles are the first to become paralyzed, likewise they are the last to regain their tone at the end of the operation. The time and amount of the last dose should be closely estimated so that the facial muscles have regained their tone by the time the mask is lifted from the face. Knowledge of the speed and habits of the surgeon as well as close observation of the progress of the operation is an essential requisite of a good anesthetist. The final dose of the agent should be given several minutes before the peritoneum is due to be closed. Administration during closure may leave the patient too depressed by the time the operation is completed. Use of a shorter acting drug for the last dose such as syncurine can have its advantages.

A question which often arises is in regard to the necessity for endotracheal intubation of a patient. Despite the fact that intubation has been considerably facilitated in recent years by the use of curare, I do not believe it should be employed as a routine measure. Intubation is not without its hazards. Many patients complain of hoarseness and soreness of the throat for several hours after the tube has been removed. Other sequelae of the trauma such as ulceration of the trachea and granulomata of the vocal cords have been reported. Electrocardiographic studies have revealed changes of a reflex nature which begin at the moment the tube is passed. Insufficient depth of anesthesia and prolonged attempts at intubation were found to be an important factor in causing these changes. Preoperative intubation is necessary in all chest operations and in all others where either pleural cavity may be opened inadvertently. Practically all operations involving the head, face, neck and oral cavity where sterile drapes are placed around that area likewise require intubation. In surgical procedures within the abdominal cavity, especially in the very muscular or obese patients, it is often wise to plan intubation. Intubation should be done at any phase of an operative procedure when one feels that improvement in respiratory exchange is necessary. However, a great majority of our surgery is done without employing intubation by using an oral airway and almost constant supplemental reinforcement of each respiration. As long as you can furnish safe anesthesia with good respiratory exchange and sufficient muscular relaxation, I feel that the most simple method of administration is the best.

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TOTAL INTRATHORACIC GOITERS
With Particular Emphasis on Posterior Mediastinal Location

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ALTHOUGH A. Haller described intrathoracic goiter in 1749 and literature on the subject has been voluminous, the danger of an adenomatous goiter becoming intrathoracic is still not fully appreciated. Much confusion has arisen from the failure to properly classify intrathoracic thyroid extensions.

As the therapeutic difficulties of partial and total intrathoracic goiters vary greatly, the following classification is emphasized:

THORACIC GOITERS

A. *Substernal Goiter*

Synonyms: Retrosternal or subclavicular goiter; struma profunda (Kocher); plunging or diving goiter; partial or incomplete intrathoracic goiter.

Such extension of thyroid tissue behind the upper end of the sternum or ends of the clavicle is a common manifestation of thyroid disease and is reported in 10 to 30 per cent of all goiters. The extension is only partially through the superior thoracic aperture.

As substernal thyroids offer no particular problem in diagnosis and therapy, they are excluded from this discussion.

B. *True Intrathoracic Goiter*

Synonyms: Total or complete intrathoracic goiter; mediastinal goiter.

Here the intrathoracic extension is completely below the superior thoracic strait and totally confined within the chest. True intrathoracic goiters are relatively uncommon, occurring in approximately 1 per cent of goiters. Crile[5] found 97 total intrathoracic goiters with extension down as far as the arch of the aorta in a series of 11,800 thyroidectomies.

Intrathoracic goiters are a disease of middle and later life. The youngest patient in this series was 45; the oldest was 71, with average age of 58 years. Crile found an incidence of only seven per cent under 40 years of age. The disease is more common in females by a ratio of 5 or 6 to 1. Both the age and sex distribution are not surprising as adenomatous goiter is more common in the females of advancing age.

Etiology and Pathogenesis. Almost without exception intrathoracic goiters result from the descent of cervical thyroid adenomas. Varying stages of descent have been repeatedly demonstrated. There is a rare possibility that the displaced thyroids result from aberrant or ectopic thyroid tissue, since early in development, the thyroid bud lies in front of the second aortic arch. Although Higgins[8] reported 3 instances in which diffuse goiters extended into the thorax, such authorities as Lahey, Crile and Clute have never encountered an instance of diffuse goiter in the mediastinum.

Intrathoracic goiters usually originate from the lower poles of the lateral lobes, but may arise from the isthmus. Downward extension is natural for it is the plane of least resistance as the deep cervical fascia extends uninterruptedly into the mediastinum. Extension anteriorly is made difficult by the overlying strap muscles, while posterior growth is impossible due to the bodies of the vertebrae and prevertebral musculature. Descent is facilitated by the upward and downward motion of the thyroid with swallowing, by flexion and rotation of the head and the movements of respiration. Smaller nodules may be able to ascend and descend from the chest to the neck with forceful expiration, coughing or extension of the head (diving or plunging goiter). With enlargement, the nodule becomes imprisoned below the superior thoracic strait and extends further into the thorax with continued growth.

Although the possibility of descent of a thyroid nodule into the posterior mediastinum has often been mentioned in the literature,[4] this has not been commonly accepted by most physicians. Case reports of posterior mediastinal goiter are not infrequent.[13] Sweet[16] recently reported a series of 6 intrathoracic goiters located in the posterior mediastinum. These reports and our own experience lead us to the conclusion that the frequency of posterior mediastinal goiter is not appreciated.

While the descent of a nodule arising from the isthmus of the thyroid would probably be in front of the trachea into the anterior mediastinum, it is likely that many of the nodules extending from the lower poles of the lateral lobes will descend along the bodies of the vertebrae and will lie predominately, if not entirely, in the posterior mediastinum. There is usually lateral and anterior displacement of the trachea and recurrent laryngeal nerves. Sweet has emphasized that it is most important to distinguish preoperatively between the anterior and posterior mediastinal goiters, for the former can almost invariably be removed through a cervical incision, while the latter may require a thoracotomy if unusually large. In the 6 cases he reported,[16] the thoracic approach was mandatory in 2 and preferable in 1.

It has been said that intrathoracic goiter occurs more frequently on the left side.[8] From our experience with true intrathoracic goiter we have noted a decided tendency for the masses to descend behind and to the right of the trachea. Descent to the right is probably encouraged by the obliquity of the arch of the aorta, which ascends backward and to the left in front of the trachea. It is readily conceivable that the vigorous pulsations of this large vessel could guide a descending thyroid nodule towards the right by virtue of its normal curvatures.

Clinical Manifestations. Many intrathoracic extensions are symptomless and are detected during routine roentgen examination. Occasionally quite large goiters will produce no detectable symptomatology, while smaller ones may so compress vital structures as to produce intolerable symptoms. The striking features in the clinical picture are the result of mechanical or pressure effects, the most predominant being tracheal compression. A sensation of discomfort or heaviness behind the sternum associated with dyspnea on exertion is quite common. Choking spells or periods of acute dyspnea may be precipitated by movements of the head. Fatal suffocation from incarceration of an intrathoracic thyroid nodule in the superior thoracic strait is not uncommon and represents a constant danger to those patients with partial tracheal compression.

A chronic nonproductive cough may be produced by encroachment on the tracheal lumen. Actual tracheal stridor with characteristic wheezing closely simulating asthma may result. Displacement and angulation of the esophagus by the mediastinal mass may produce varying degrees of dysphagia. Due to the elasticity and increased length of the esophagus, compression of this organ is tolerated much better than tracheal encroachment. Marked deviation of the esophagus is more likely to be associated with goiters in the posterior mediastinum.

Pressure on the large mediastinal veins may produce a "superior vena cava syndrome" with marked suffusion and puffy edema of the face. For anatomical reasons, this occurs more often in anterior mediastinal goiters. Pressure on and stretching of the recurrent laryngeal nerve may result in impaired mobility of the vocal cord with secondary voice changes. It should be emphasized that the finding of recurrent laryngeal palsy in itself does not preclude malignant degeneration, as this phenomena may be associated with the gradual stretching of a benign intrathoracic thyroid. Rarely one encounters a chylothorax or Horner's syndrome from pressure on the thoracic duct or sympathetic chain.

Evidence of mild toxicity is not uncommon in intrathoracic thy-

roid disease. Wakeley and Mulvany[18] report 7 out of 20 patients with intrathoracic goiters to be clinically toxic; 2 of the 6 reported here were mildly toxic. The usual manifestations are tachycardia, tremor, nervousness and mild to moderate weight loss. It may be particularly difficult to evaluate the clinical toxicity as many of these patients are at or near the menopause. As mediastinal goiters often present varying types of degenerative processes, they do not lend itself particularly well to the development of hyperplasia, so the toxicity is usually mild.[18]

The possibility should constantly be borne in mind, however, as preoperative preparation to overcome the toxicity will increase the likelihood of a smooth postoperative convalescence. Unless the patient is iodine-fast, Lugol's solution will usually be sufficient to prepare the patient. In the rare case with severe toxicity, the use of one of the antithyroid drugs such as propyl thiouracil or tapazole may become necessary. When there is tracheal encroachment, these drugs must be used with extreme caution, as enlargement of the thyroid mass not uncommonly occurs during their administration. Such enlargement could convert a mild into a severe tracheal obstruction.

Diagnosis. As the intrathoracic extension may be completely separated from the cervical goiter, it could easily be overlooked during a thyroidectomy. Search for thoracic extension should be routine in thyroidectomy for nodular goiter. All patients with adenomatous goiter should have preoperative fluoroscopy or roentgenograms to exclude an extension into the mediastinum. The possibility should be strongly considered in any patient with a mediastinal mass who has had a previous thyroidectomy for adenomatous goiter. Two of the 6 cases reported here had been subjected to previous thyroidectomy for nodular goiter. The diagnosis should be suspected in cases of toxicity without clinical enlargement of the cervical thyroid. The "asthmas" of middle and later life should be carefully investigated, as the wheezing may be secondary to tracheal distortion from a mediastinal tumor or bronchogenic carcinoma. From our experience the lesion is sufficiently common to be considered in the differential diagnosis of every mediastinal tumor.

In distinguishing mediastinal thyroids from other common mediastinal tumors, Lahey emphasizes that tracheal deviation would be more likely in thyroid tumors than in dermoids or bronchogenic cysts. He cites ascent and descent of a mediastinal thyroid with swallowing as an outstanding diagnostic feature. A mediastinal thyroid may be incarcerated by the superior thoracic strait or entirely separate from its cervical component and thus not move with deglutition.

Touroff[17] points out that the diagnosis of intrathoracic goiter can be made in practically 100 per cent of cases since radioisotopes have become available. In 20 to 21 intrathoracic extensions of thyroid tissue positive results were obtained with radioactive iodine "tracer studies." The only incorrect diagnosis was a case of very thin-walled colloid cyst in which there was little or no functioning thyroid tissue.

Technical Considerations. Excisional surgery remains the treatment of choice in thoracic goiters. Irradiation is valueless as a therapeutic procedure. Radioactive iodine should probably be reserved for those cases of superimposed malignancy in which local extension into vital structures makes excision impossible. If the condition of the patient permits, early surgery is mandatory, as delay invites increase in technical difficulty from enlargement of the mass and development of adhesions. Thoracic adenomas have the same 5 to 10 per cent malignant potential that cervical goiters do, and from this standpoint alone should be removed as early as possible.

Most total intrathoracic goiters can be removed through the conventional cervical approach. It is surprising how large intrathoracic extensions can be removed through the neck with relatively little difficulty. This is particularly true when morcellation or piecemeal intracapsular removal is done (Lahey). Splitting the sternum is rarely necessary. Transthoracic approach is the preferable one in large intrathoracic goiters, particularly those located in the posterior mediastinum. This exposure seems to be the one of choice when the diagnosis is in doubt, and in those cases with marked calcification or suspected malignant degeneration.

Perhaps the most important single factor in removal of thoracic goiters through the cervical approach is complete control of the blood supply before beginning any manipulation within the mediastinum. As thoracic goiters are descended cervical adenomas, they retain their cervical vascular supply. Occasionally aberrant vessels from the mediastinum are encountered, but in the majority of cases the main blood supply is from the superior and inferior thyroid vessels. As a rule the mediastinal extension has a "surgical capsule" just as does a cervical thyroid. Careful dissection within this capsule greatly facilitates the removal of the mediastinal thyroid and practically obviates the possibility of damage to adjacent structures, particularly the recurrent laryngeal nerves. Packing of the mediastinal space left after removal of a thyroid nodule is indicated only to control bleeding for the space will obliterate rapidly with shifting

of the trachea and full expansion of the lung. It is usually advisable to insert a small rubber tissue drain for 36 to 48 hours.

The difference of opinion as to the anesthetic of choice applies to thoracic as well as to cervical thyroids. Although there are those with a wide thyroid experience who prefer local anesthesia in the removal of thoracic goiters, it seems safer to use a relatively rigid intratracheal tube in these cases. If the tracheal compression is appreciable, the tube should be passed under topical anesthesia before beginning the general anesthetic.

Case Reports

The case histories of 6 posterior mediastinal goiters are given below. The finding of these cases during the past year in a nonendemic thyroid area indicates that total intrathoracic thyroid extensions located in the posterior medi astinum are not unusual.
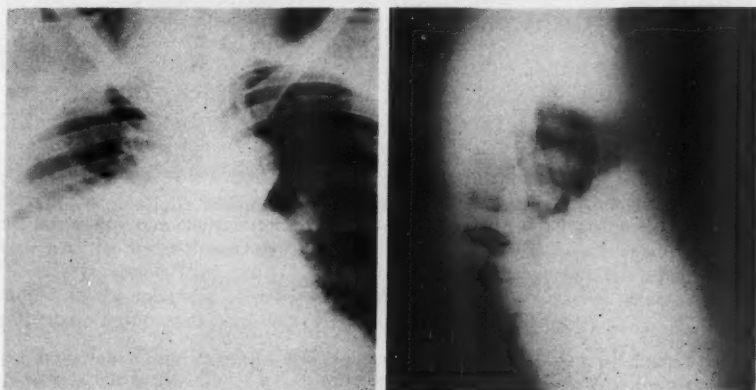

Fig. 1 (a) and (b). Case 1. Huge mediastinal goiter weighing 1,730 Gm. resting on right diaphragm and displacing lung superiorly.

Case 1. M. C., 45 year old female, complained of smothering, choking sensations and retrosternal pain. Seven years previously she had had a huge nontoxic nodular goiter removed. Physical examination revealed dullness anteriorly and posteriorly with absent breath sounds in the lower half of the right chest. Chest roentgenograms (fig. 1) revealed a large opacity of homogeneous density with numerous areas of discrete calcification extending from the diaphragm to the sixth rib posteriorly. With a preoperative diagnosis of large dermoid cyst of mediastinum, posterolateral thoracotomy revealed a huge nodular goiter projecting from the posterior mediastinum behind the heart, resting on the diaphragm and displacing the right lung upwards with partial collapse of the lower lobe. The mediastinal attachment was broad, measuring approximately 8 by 4 cm. and quite vascular. Complete removal was feasible; convalescence uneventful.

Pathological Description. The thyroid mass measured 20 by 28 by 10 cm.

and weighed 1,730 Gm. The histologic picture was that of a nodular colloid goiter.

Discussion. This is the largest mediastinal goiter which we were able to find recorded in the surgical literature. DeCourcy and Price[7] reported an anterior mediastinal thyroid measuring 15 by 11 by 8 cm. and weighing 655 Gm., which was apparently the largest reported up to 1944. Such a marked descent of a thyroid nodule is unusual, but has been reported before. Means[14] reports a similar case in which Churchill removed a thyroid nodule resting on the diaphragm.
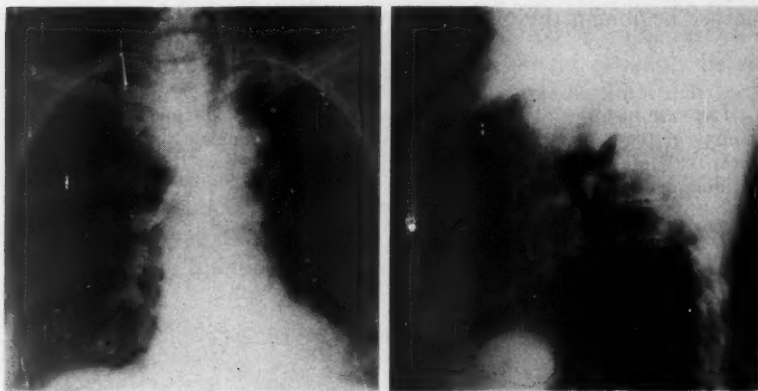

Fig. 2 (a) and (b). Case 2. Posterior mediastinal goiter displacing trachea to the left and anteriorly. No abnormality of the cervical thyroid was found with repeated examinations.
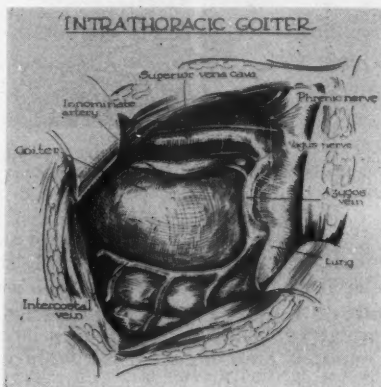

Fig. 3. Diagram of operative findings in cases 2 and 3. Note that the tumor rests on the bodies of upper thoracic vertebrae, displacing the trachea and esophagus to the left and anteriorly. (After Sweet.)

CASE 2. O. L., 67 year old female, presented productive cough of two months' duration. Although the patient seemed hoarse, she denied voice changes. There had been no pain, discomfort or dyspnea.

The thyroid was neither enlarged nor nodular. There was dullness to the right of the sternum below the clavicle. Chest roentgenograms (fig. 2) revealed an oval mass measuring about 4 by 8 cm. lying in the medial gutter of the right apex and displacing the trachea to the left. Bronchoscopy and angio-cardiography were negative.
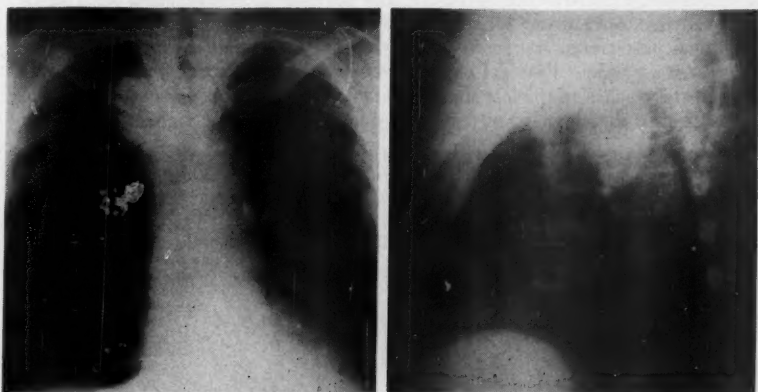

Fig. 4 (a) and (b). Case 3. Typical posterior mediastinal thyroid presenting opacity bulging into upper right chest.

Through a posterolateral thoracotomy a typical posterior superior mediastinal goiter (fig. 3) with protrusion through the space bounded anteriorly by the superior vena cava, inferiorly by the azygos vein and posteriorly by the bodies of the upper thoracic vertebrae was found. The mass was readily freed, three large vessels (apparently inferior thyroid) were ligated. No other blood supply to the mediastinal mass was noted. Convalescence was smooth. The pathologic report was nontoxic colloid adenoma.

Discussion. This case was interesting from the standpoint of diagnosis, as there was no history of antecedent thyroid disease nor was any abnormality of the thyroid detected clinically. Transthoracic approach seemed preferable here as there was doubt as to the exact diagnosis.

CASE 3. M. R., 51 year old hypertensive female, complained of exertional dyspnea and retrosternal discomfort. Subtotal thyroidectomy for toxic nodular goiter had been done five years previously. Basal metabolic rate was plus 33 per cent. Roentgenograms (fig. 4) revealed an oval mass measuring about 4 by 8 cm. to the right of the trachea. The mass presented no pulsation, was sharply demarcated at its borders and smoothly indented and slightly displaced the trachea to the left and anteriorly.

The clinical diagnosis of posterior superior mediastinal goiter was confirmed at exploratory thoracotomy after preparation with iodine. A firm, somewhat nodular mass, roughly the size of an orange, projected from the superior mediastinum, behind the superior vena cava and innominate artery (fig. 3). The entire blood supply came from above, apparently from the inferior thyroid vessels. Smooth convalescence followed the thoracic thyroidectomy and allowed discharge on the seventh postoperative day.

Discussion. The diagnosis was more definite as there had been previous thy-

roid surgery. In retrospect, it is likely that a cervical approach would have been preferable here.

CASE 4. J. B. P., 48 year old male, had been "chest" conscious for three years and had intermittent episodes of coughing. Six weeks previously he presented a single massive hemoptysis. Chest roentgenogram revealed an irregular calcified mass measuring 4 by 6 cm. at the apex of the right lung field. This mass was posterior, lying against and lateral to the bodies of the upper thoracic vertebrae (fig. 5). Physical examination was normal except for slight deviation of the trachea to the left; it was possible to palpate the apex of a stony-hard mass deep to the clavicle and sternomastoid muscle on the right.
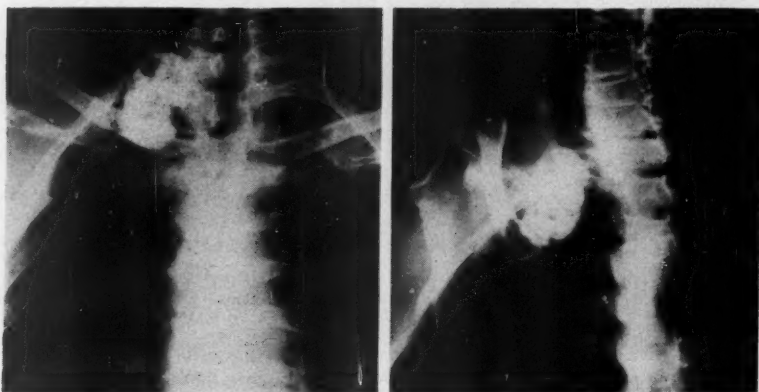

Fig. 5 (a) and (b). Case 4. Calcified posterior mediastinal mass which is believed to be of thyroid origin.

Posterolateral thoracotomy revealed a calcified, irregular mass about the size of a small orange in the posterior superior mediastinum. The subclavian artery passed through a deep groove in the upper pole of the mass. In attempting to free the vessel brisk hemorrhage ensued. A 1 cm. segment of the subclavian was resected in removing the mass. Although there was no evidence of arterial insufficiency in the right upper extremity, the second and third thoracic sympathetic ganglia were resected prophylactically. Postoperative convalescence was smooth.

Pathological Description. The specimen consists of a gray lobulated mass, measuring 5.5 by 5 x 3.5 cm. Multiple histologic sections showed a homogeneous pink-staining tissue with no cells or recognizable structure to indicate an exact origin of the tumor. From its position the most likely diagnosis is calcified posterior mediastinal thyroid.

Discussion. It must be admitted that this tumor may have been a calcified neurofibroma, as neurogenic tumors are the most frequent found in the posterior mediastinum. The blood supply was derived from two large branches of the subclavian artery, which entered directly into the tumor. Avery[2] records a case of mediastinal goiter with aberrant blood supply from the right subclavian artery. It would have been all but impossible to successfully remove this particular mass through a cervical approach, as the subclavian artery arched over and was densely adhered in a deep groove at the apex of the mass.

From this limited experience with calcified intrathoracic goiters, it is suggested that a thoracic approach be utilized if the degree of calcification is marked.

CASE 5. M. W., 68 year old female, presented an enlarging mass in the lower neck with increasing choking sensations. Physical examination revealed a well circumscribed, solitary nodule about 6 cm. in diameter in the right lobe of the thyroid. As it was possible to palpate the lower end of the nodule, a chest plate was deferred for financial reasons. (As subsequently shown, this was certainly false economy.)

The cervical thyroid nodule was completely removed by effecting a right hemithyroidectomy. The left lateral lobe was entirely normal and was preserved. There was no obvious evidence of intrathoracic extension. The anesthesiologist was fortunately alert and insisted that the tracheal obstruction had not been relieved by the removal of the cervical nodule. Palpation then revealed a posterior superior mediastinal thyroid nodule which measured 6 by 4.5 cm. This mass was behind the innominate artery and rested on the upper thoracic vertebrae, displacing the trachea to the left and anteriorly. There was no connection between the cervical and intrathoracic thyroid nodules. The inferior thyroid was ligated and the mediastinal mass removed by morcellation. After removal of the intrathoracic nodule a discrete compartment in the posterior mediastinum which was bounded posteriorly by the bodies of the vertebrae, laterally by the pleura, anteriorly by the innominate artery and superior vena cava was noted. The recurrent laryngeal nerve was displaced medially and anteriorly with the trachea. Postoperative convalescence was uncomplicated.
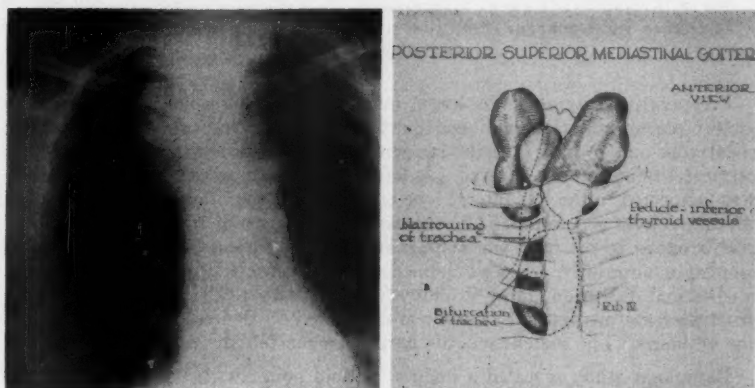

Fig. 6 (a) and (b). Case 6. Roentgenogram and diagram depicting descent of thyroid nodule from left lateral lobe to occupy a predominantly right position in the posterior superior mediastinum.

The pathologist reported nontoxic colloid adenomata.

Discussion. This case vividly emphasizes the need for routine fluoroscopy or chest roentgenograms in all cases of nodular goiter. In attempting to make an economic short-cut, an intrathoracic goiter, which was contributing more to the patient's symptoms than was the cervical component, was almost overlooked.

CASE 6. Mrs. J. W., female of 71 years, presented acute respiratory obstruction and a large nodular goiter. There was puffiness of the face which was most marked in the periorbital region. There seemed to be some widening of the mediastinum to percussion anteriorly.

Roentgenologic examination of the chest disclosed the presence of a dense, sharply demarcated, oval mass extending into the mediastinum to the right of and behind the trachea and esophagus, which were deflected sharply forward (fig. 6). In a lateral view the tracheal lumen seemed to be compromised about 50 per cent (fig. 7). Basal metabolic rate was plus 24 per cent.
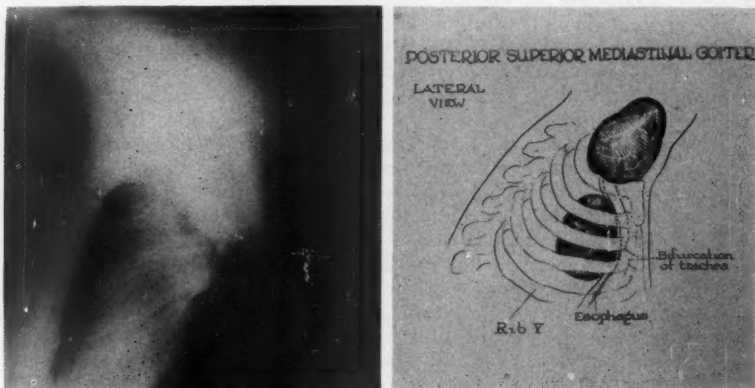

Fig. 7 (a) and (b). Case 6. Roentgenogram and diagram depicting angulation of trachea and esophagus effected by cervical and posterior mediastinal thyroid nodules.

Preoperative diagnosis was large, mildly toxic nodular goiter with a complete posterior superior mediastinal extension. After insertion of an endotracheal tube under local anesthesia, general anesthesia was given and radical cervical thyroidectomy effected. A large posterior mediastinal thyroid which was connected to the left lateral lobe only through the branches of the inferior thyroid vessels was found. The thoracic thyroid extended across the bodies of the vertebrae to the right side with marked angulation of both the trachea and esophagus anteriorly. A well defined surgical capsule greatly facilitated the mediastinal dissection aiding in delivery of the mass to the neck. No bleeding from aberrant mediastinal vessels was encountered. Penrose drainage was used for 48 hours. The patient was discharged on the fourth postoperative day.

Pathologic study revealed a nodular colloid goiter with cystic degeneration, hemorrhage and calcification. The mass of thyroid tissue removed from the posterior mediastinum measured 8 by 6.5 by 4.5 cm.

Discussion. Severe tracheal narrowing with marked dyspnea was produced by a large cervical and posterior mediastinal goiter. The latter arose from the left lateral lobe but traversed the posterior mediastinum and presented most prominently on the right. Descent to the right was probably influenced by the pulsations of the aortic arch.

CONCLUSIONS

Five unquestionable and one probable posterior mediastinal

goiters are recorded to emphasize the frequency of complete or total intrathoracic goiters in the posterior mediastinum. The first case apparently represents the largest intrathoracic thyroid thus far removed and is of interest in that the descent was complete with the huge thyroid nodule resting upon the right diaphragm. It is of interest that all six of the posterior mediastinal goiters presented predominantly into the right chest. This is probably due to the obliquity of the arch of the aorta; its pulsations may guide descending thyroid nodules towards the right. Transthoracic thyroidectomy was used in 4 cases; it was mandatory in 3 cases because of huge size and location of the tumor, marked calcification and questionable diagnosis, respectively.

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GALLSTONE OBSTRUCTION OF THE INTESTINAL TRACT

A Review of Fifteen Cases

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THE fact that mechanical obstruction of the intestinal tract by gallstones is not a pathologic rarity was emphatically impressed on us by the occurrence of 4 such cases during a one month period at Georgetown University Medical Center. This experience prompted a search of our records for all such cases during recent years. During the period of 1938 to 1950, 15 cases were found and reviewed.

The first report of fistulization of a gallstone from the gallbladder into the intestine was made, according to Martin,[1] by Bartholin in 1654. Moore[2] in 1925 estimated that 400 cases of gallstone ileus had been reported, and since that time many additional case reports have appeared. However, no large series has been collected from any single institution. In a review from the Mayo Clinic, Wakefield, Vickers, and Walters[3] reported 10 cases, while Hinchey[4] collected 13 cases from the Salem Hospital, Salem, Mass., during a 25 year period.

According to Wakefield et al. gallstone ileus constitutes "the rarest of all reasonable causes of intestinal obstruction." However, it has been variously estimated that impacted gallstones in the intestinal tract account for 0.5 to 2.0 per cent of all cases of intestinal obstruction. This incidence unquestionably assumes a more impressive proportion as a cause of intestinal obstruction in females beyond the age of 45 who have not undergone abdominal surgery. Hinchey found that the incidence of gallstone ileus, like that of cholelithiasis, is greater in females than in males by a ratio of 5:1. In this series only 2 of the 15 cases occurred in males. The average age in our group was 64.6 years with a range of 47 to 84 years. In the majority of instances the individuals were described as being obese.

PATHOLOGY

Except in very rare instances gallstones of size sufficient to cause intestinal obstruction reach the intestinal tract through a cholecysto-enteric fistula. This fistulization takes place in most cases between the gallbladder and the duodenum, and, less frequently, the stomach, jejunum, ileum or colon is the site of the fistula. In a review of 152 cholecysto-enteric fistulas reviewed by Wakefield *et al.*, a cholecystoduodenal fistula was found in 101, a cholecysto-colonic fistula in 33, and in 11 the fistula occurred between the gall-bladder and the jejunum or ileum. Intestinal obstruction resulted in only 10 of these 152 cases. In this series a cholecystoduodenal fistula was found at operation or at autopsy in 13 cases while in 2 a cholecystocolonic fistula had developed (table 1).

TABLE 1

Type of Fistula	Site of Obstruction
Cholecystoduodenal (13)	jejunum (3) ileum (9) sigmoid (1)
Cholecystocolonic (2)	sigmoid (2)

Although cholecystitis with cholecystolithiasis is invariably a precursor of a cholecysto-enteric fistula, resulting in inflammatory fixation and erosion into the adjacent bowel, a history of biliary tract disease is frequently lacking, being noted in only 5 of the 15 cases in this series. Neither in the cases of this series nor in the reported cases has an instance of cholecysto-enteric fistula as the result of a perforating peptic ulcer or carcinoma been identified.

It has been suggested that a gallstone resulting in intestinal ileus may pass through the ampulla from an enormously dilated common duct. Courvoisier[6] reported seven such occurrences in 35 cases of gallstone ileus, in all of which there was associated jaundice. On the other hand, Wakefield *et al.* found no such occurrence. In all of our cases a fistula was identified and in no case was there associated jaundice.

The intestinal obstruction resulting from a gallstone is invariably of an intrinsic obturative type, the stone advancing through the intestinal tract until its progress is halted at a point at which the size of the stone exceeds the lumen of the intestine or by associated spasm, this point being in the majority of cases the terminal ileum. However, other factors, such as adhesions, a Meckel's diverticulum, regional enteritis or diverticulitis may result in narrowing of the

bowel with arrest of the stone. In none of our cases had previous abdominal surgery been performed, and in only 1 had the stone impacted at the site of an inflammatory area of narrowing.

The size of the gallstone is of obvious importance in the production of ileus. According to Barnard[7] a stone less than 2½ cm. in

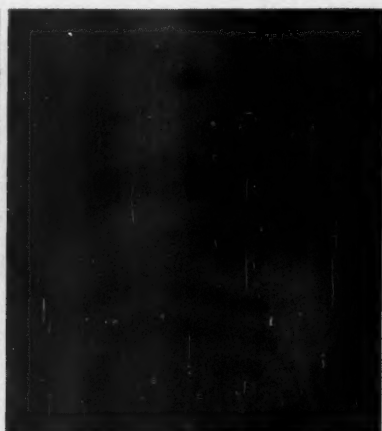Fig. 1. A 3.5 cm. stone that passed through the ileocecal valve.

Fig. 2. Flat plate of abdomen showing numerous fluid levels.

diameter will usually pass spontaneously. Gutmann[8] has estimated that less than one half of gallstones reaching the intestinal tract create intestinal obstruction. The site of obstruction in this series was the ileum in 9 cases, the sigmoid in 3, and the jejunum in 3 (table 1). In the 3 cases of sigmoid obstruction the gallstone entered the intestinal tract via a cholecystocolonic fistula in 2 and by way of the duodenum in 1. In this latter case a stone measuring 3.5 cm. in diameter had passed through the ileocecal valve (fig. 1). The size of the obstructing gallstone varied markedly, the smallest being 2.2 cm. in diameter and the largest 4½ by 3 cm. It is noteworthy that in the case of the smallest stone the obstruction occurred in the jejunum proximal to which two ulcerated areas were encountered, indicating that an enteric spasm produced by local irritation may also play a role in the arrest of the stone.

DIAGNOSIS

Our experience coincides with the general impression that a correct preoperative diagnosis of gallstone ileus is seldom made (table 2). In 13 cases a preoperative diagnosis of intestinal obstruction was made, and of these a tentative or definite diagnosis of gallstone ileus was made in 4. In 1 of these, roentgenologic demonstration

of a round, radiopaque mass within a distended loop of small bowel was the key to the correct diagnosis. In another the patient vomited three small gallstones and on pelvic examination a firm, discrete mass, measuring 3 cm. in diameter, was palpated and its true nature was suspected. In 2 cases the preoperative diagnosis of gallstone ileus was considered because of clinical and roentgenologic evidence of small bowel obstruction in elderly females in whom there had been no previous abdominal operations. In 1 of these a clear-cut history of cholecystitis was obtained.

TABLE 2

Preoperative Diagnosis (15 Cases)

A. Small Bowel Obstruction (10)
     gallstone ileus (1—roentgenologic demonstration of stone)
     gallstone ileus (1—vomited 3 gallstones)
     gallstone ileus suspected (2—elderly females—no previous abdominal surgery)
B. Large Bowel Obstruction (3)
     diverticulitis granuloma sigmoid (1)
     carcinoma sigmoid (1)
C. Acute appendicitis (2)

TABLE 3

Clinical Features (15 Cases)

History of Gallbladder Disease:	acute	0
	chronic	5
Crampy Abdominal Pain:		15
Obstipation:		8
Vomiting:		12 (absent or minimal in 3 cases of sigmoid obstruction)
Abdominal Distention:		5—moderate to marked
		6—slight
		4—absent
Abdominal Tenderness:		2—absent
		9—slight, generalized
		2—localized RLQ
		2—localized LLQ
Palpable Mass:		3

The clinical features of these cases were not remarkably inconsistent (table 3). A clear-cut history of previous gallbladder disease should arouse a suspicion of the correct diagnosis. However, in these 15 cases such a history was elicited in only 5. Wakefield *et al.* noted a similar absence of a definite history of gallbladder disease in the majority of cases. Although fistulization is assumed

to follow in the wake of acute cholecystitis, a history of severe and acute upper abdominal pain associated with other evidence of acute cholecystitis was elicited in none of our cases.

As in other forms of intestinal obstruction a characteristic triad of symptoms, namely: (1) crampy abdominal pain, (2) obstipation, and (3) vomiting, occurs. As the obstructing calculus progresses in the intestinal tract, abdominal pain of a crampy nature may have occurred for a variable length of time, indicating repeated attacks of partial obstruction. In our cases the pain had been present for 1 to 36 days prior to admission, although in most cases moderately severe, generalized abdominal pain of a crampy nature had been present for several days. Obstipation occurred in 8 of these 15 cases, whereas in 5 the passage of gas as well as some feces up until the time of surgery occurred. In 2 cases a mild diarrhea was present. In the 12 cases in which the gallstone had impacted proximal to the ileocecal valve, repeated and copious vomiting resulted. In the remaining 3 cases in which the sigmoid was the site of obstruction vomiting did not occur in 2 and was minimal in 1. It was also noted that, in the 3 cases in which the obstruction occurred in the jejunum, the vomiting was of such degree that the patients were dehydrated and in electrolytic imbalance on admission.

Abdominal distention is characteristically mild to moderate in degree. In this series it was absent in 4, slight in 6, moderate in 2 and marked in 3. The occurrence of abdominal tenderness of a localized nature indicates an advanced degree of pathology, *i.e.*, oozing or perforation of the bowel at or proximal to the site of obstruction. In 2 cases localized tenderness in the right lower quadrant led to a preoperative diagnosis of acute appendicitis. Of the 3 cases in which the obstruction occurred in the sigmoid, 2 were associated with left lower quadrant tenderness. A palpable abdominal mass was found in only 3 of the cases. In 2 of these a mass, palpable in the left lower abdomen, proved at operation to be an inflammatory process in the sigmoid. In the third case a firm mass, 3 cm. in size, preoperatively palpable on pelvi-abdominal examination in the right adnexal region, proved at operation to be a gallstone impacted in the terminal ileum. It was not felt by the same examiner postoperatively. In this series the leukocyte count averaged 13,500 per cu. mm.

ROENTGENOLOGIC DIAGNOSIS

A flat plate of the abdomen in both the supine and upright positions is probably the most helpful aid in establishing a diagnosis of gallstone ileus. According to Rigler, Borman and Noble[9] the roentgenologic evidence of this condition depends on: (1) the demon-

stration of the fistula by air or contrast media, (2) the demonstration of a gallstone in the obstructed bowel, and (3) the demonstration of intestinal obstruction by the usual finding of dilated loops

Fig. 3. Roentgenologic demonstration of obstructing calculus in bowel.

Fig. 4. Air visualized in common and hepatic ducts.

Fig. 5. Air visualized in gallbladder and cystic duct.

of bowel with fluid levels. In this series a flat plate of the abdomen was taken in 11 of the 15 cases. In each of these, dilated loops of bowel with fluid levels were observed (fig. 2). In only a single case, however, was gallstone ileus suggested as the cause of the obstruction by the roentgenologist. In this case the radiopaque calculus was observed in an obstructed loop of the bowel (fig. 3). However, on reviewing the x-rays after the diagnosis had been established at operation or in subsequent x-ray studies, positive roent-

TABLE 4

Roentgenologic Findings (11 Cases)	
Small Bowel Obstruction (dilated loops with fluid levels)	9
—gallstone visualized in obstructed bowel	1
—air in the common and hepatic ducts	1
—air in the gallbladder	1
Large Bowel Obstruction (dilated loops of small and large bowel)	2
—air in gallbladder and common duct	1

genologic evidence was identified in 3 other cases (table 4). In 1 of these, air in the common and hepatic ducts was noted (fig. 4), while in another, air in the gallbladder was seen (fig. 5). In the third case, in which a barium enema after the passage of a gallstone by rectum revealed the presence of a cholecystocolonic fistula, air
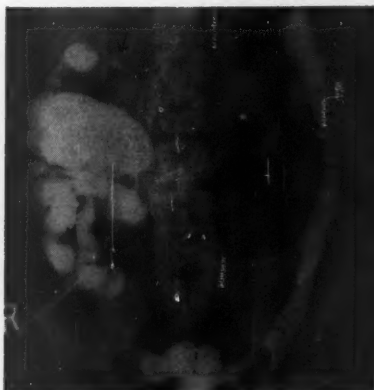

Fig. 6. Demonstration of a cholecysto-colonic fistula by means of a barium enema: cystic duct filled with barium.
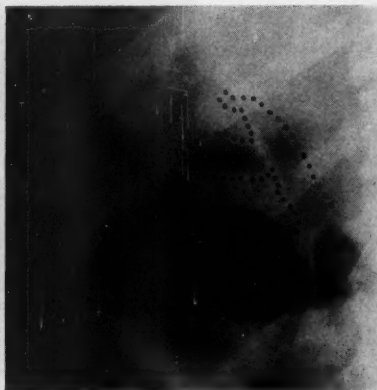
Fig. 7. Air in cholecystocolonic fistula, gallbladder and in common bile duct.

was observed in the gallbladder and common duct in the preliminary film (figs. 6, 7). Therefore, in 36 per cent of the cases studied roentgenologically, x-ray evidence of gallstone ileus was observed.

TREATMENT

The treatment of gallstone ileus differs in no important way from that of any type of intestinal obstruction. However, if a positive diagnosis can be established on the basis of roentgenologic evidence, nonoperative measures are less likely to be utilized. Since most of these patients are in relatively good condition, decompression by means of Wangensteen siphonage applied to an indwelling stomach or intestinal tube plus restoration of fluid and electrolytic balance may be carried out. However, the prolonged use of decompression

by means of a Miller-Abbott or Kantor tube, in the hope that relief of spastic obstruction may permit the spontaneous passage of the impacted stone, is unwise. In 1 case in which the stone had lodged in the sigmoid a closed-loop type of obstruction with enormous distention of the proximal colon had developed. Any appreciable delay in effecting surgical relief in this instance would undoubtedly have been disastrous. Early institution of antibiotic therapy is desirable.

In the event that roentgenologic study permits localization of the obstructing calculus, the abdominal incision should be placed accordingly. However, in the absence of such information a right rectus incision is ordinarily employed. On identifying the impacted stone, several things should not be done. Manual attempts to propel the
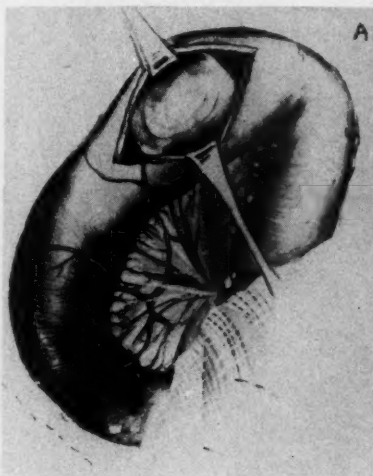

Fig. 8. Removal of disengaged stone through a longitudinal incision.

Fig. 9. Transverse closure of the longitudinal incision with interrupted silk sutures.

stone forward in order to remove it through a nonobstructed loop of bowel usually are unsuccessful and only traumatize the already injured intestine. The same may be said for attempts to crush the stone, a maneuver designed to avoid the necessity of opening the bowel. Since a decubitus ulceration usually occurs at the site of the impacted stone, its removal by incising the bowel at this point is undesirable. Our practice has been to dislodge the stone to a point approximately 1 foot from the site of impaction where it is removed through a small longitudinal incision after isolating this segment of bowel with a rubber-shod clamp (fig. 8). The opening is then

closed transversely with an inner row of catgut and an outer row of interrupted silk sutures (fig. 9). Prior to removal of the disengaged stone the proximal bowel should be carefully palpated for additional stones. This is particularly true if the obstructing stone is faceted. In 1 of our cases two additional stones were found; whereas, in another single additional stone was found and removed (fig. 10). It is interesting that in the cases of recurrent gallstone ileus reported in the literature[10] which have been few in number, the recurrent obstruction in the majority has occurred during the immediate convalescence, indicating that the second stone was probably present in the intestinal tract at the time of the original operation.
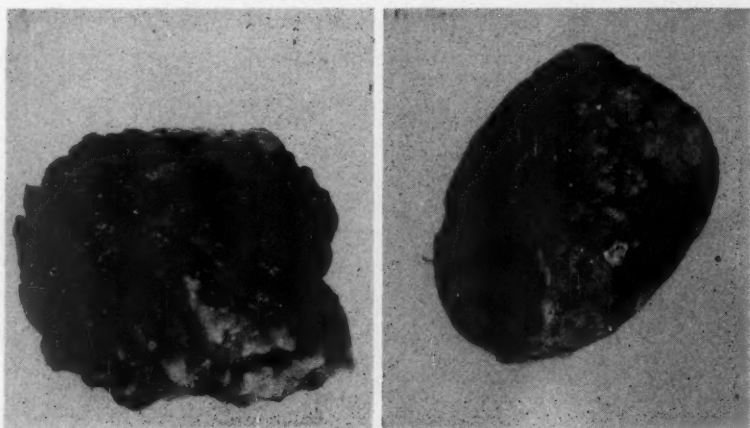

Fig. 10. Multiple stones in the small bowel.

In 2 of the earlier cases of this series an enterostomy was employed. In 1 of these a second operation for obstruction at the site of the enterostomy was required, while in the other leakage at the point of enterostomy led to a deep-seated abscess and cellulitis of the abdominal wall. Obviously this procedure is unnecessary and objectionable.

Impaction of a gallstone in the sigmoid presents a slightly more complex problem. Both removal of the impacting stone and consideration of the pre-existing inflammatory disease, if present, are necessary. Since the colon is usually enormously distended, either removal of the stone with immediate closure of the sigmoid or resection plus primary anastomosis are unsafe. Proximal colostomy, utilizing either the sigmoid above the obstruction or the transverse colon, is unquestionably the procedure of choice. Subsequent dis-

engagement of the impacted stone, either spontaneously or as the result of irrigations or transsigmoidoscopic manipulation, may permit passage of the stone per anus.

Removal of the gallbladder with repair of the cholecystoduodenal fistula at the time of the removal of the obstructing stone is unwarranted for obvious reasons. Subsequent cholecystectomy seems in the majority of cases to be unnecessary. In only 3 of our cases did a persistence of symptoms attributable to the cholecystoenteric fistula require its correction. However, in a cholecystocolonic fistula, with its attendant infection of the extrahepatic biliary tree, removal of the gallbladder and closure of the colon is indicated.

TABLE 5

Results of Treatment (15 Cases)		
	Survived	Died
Enterotomy	6	3
Enterostomy	1	1
Colostomy	2	
Cholecystectomy and Repair Fistula	3	
Exploration Mass in Sigmoid		1
No operation		1

The mortality in gallstone ileus continues to be strikingly great. Although Moore found in 1925 that the reported mortalities of various authors ranged from 50 to 100 per cent, the recent figures of Hinchey[4] reveal that the mortality continues to be approximately 50 per cent. In this series the mortality rate was 40 per cent (table 5). However, of the 6 deaths in this series, 2 of the patients were in extremis at the time of surgery, 1 expiring while being prepared for surgery and the other during the operation. In another, wound disruption with massive atelectasis following a second operation occurred. The average duration of symptoms of those who survived was 7.2 days, while in the fatal cases the symptoms had been present for an average period of 13.0 days. Undoubtedly, advanced years and obesity were factors in this mortality. Of our recent cases, all of which have been seen and operated upon early, and in whom antibiotic therapy has been liberally employed, none have died.

SUMMARY

A review of 15 cases of gallstone ileus reveals the fact that this condition should be strongly suspected in the differential diagnosis of intestinal obstruction in a middle-aged or elderly female who has had no previous abdominal operation. Because of the incompleteness and ball-valve feature of this obturative type of intestinal

obstruction, the diagnosis is not infrequently delayed for weeks or even months. By proper evaluation of the clinical features, plus accurate interpretation of the roentgenologic findings, the correct diagnosis was or should have been known or strongly suspected in 7 of the 15 cases.

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THE TREATMENT OF CERTAIN COMPLICATED
FRACTURES OF THE PELVIS

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F RACTURES of the pelvis, as all other traumatic conditions, are greatly on the increase resulting mainly from automobile injuries and similar forms of transportation. A plea for conservatism in the treatment of fractures is to be emphasized and early treatment is of utmost importance, as well as early reduction, whenever general conditions will permit. By so doing, major surgical procedures are often prevented as well as are more serious complications.

It has been the experience of the author that only in rare cases is it necessary to do open operative procedures on pelvic fractures, provided the above precautions, and good surgical judgment and technic, are carried out. In reviewing the literature on the treatment of fractures of the pelvis, one is surprised to find the multiple types of treatment and the conclusion of such a situation is that, when we have too many methods of treatment, we have seldom arrived at the proper treatment of that particular fracture.

The pelvis is a strong, broad ring of bone which supports the spine and transmits the weight of the rest of the body to the lower extremities. It also supports and offers considerable protection to the abdominal and pelvic viscera and serves as points of attachment for muscles which move the lower extremities and trunk. It is composed of the two innominate bones, which are united in front at the symphysis, and the sacrum, which closes the ring behind and articulates with the innominate bones at the sacroiliac joints.

The pelvis is so formed that by the use of arches of strong bone it is enabled to support the body weight and resist shocks and blows on all sides. Morris's Anatomy has pointed out that the pelvis consists of two main arches and that the sacrum is the keystone of both of them. The femoro-sacral arch extends from the acetabula upward, through the thick portions of the iliac bones, to the sacrum, to support the body weight in the erect position, and the ischiosacral arch extends upward from the tuberosities through the bodies of the ischia, and the thick portion of the ilia, to the sacrum, to support the body weight when sitting.

In addition to the two main arches there are two tie arches which prevent the main arches from spreading. The horizontal rami and
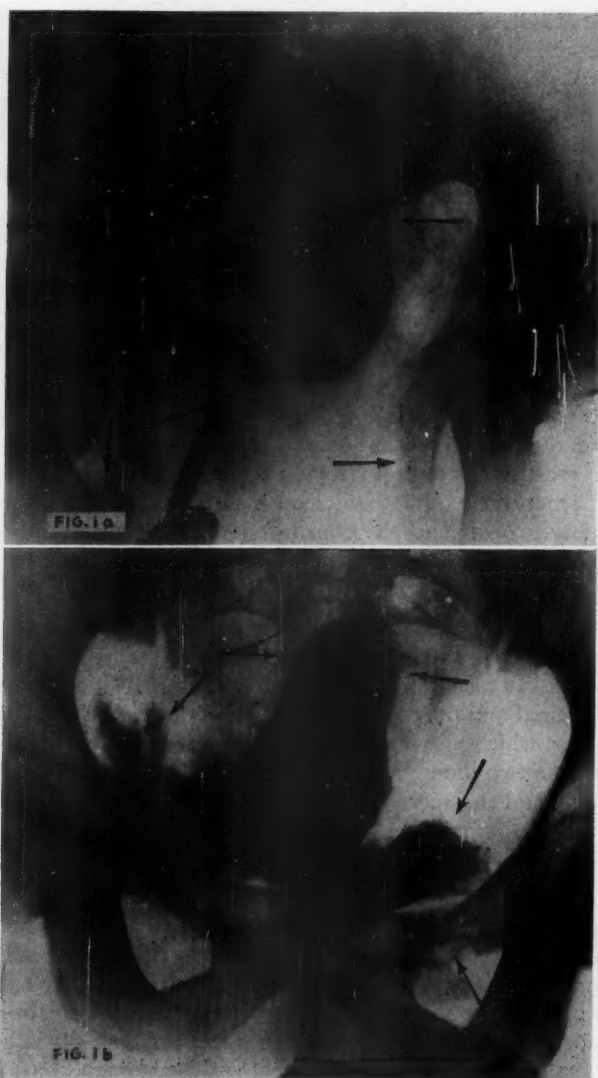
Fig. 1, a and b. Showing roentgenograms with opaque material used as bladder injection to demonstrate injury to the bladder in pelvic fractures. (Courtesy Dr. Jarratt P. Robertson, Birmingham, Alabama). a. Shows pelvic fracture displaced markedly without any bladder rupture. b. Very slight fracture of pelvis with rupture of bladder being present. It is not always necessary to have marked pelvic fractures with displacements to produce severe bladder injury. The reverse is also true as shown in Fig. a. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)
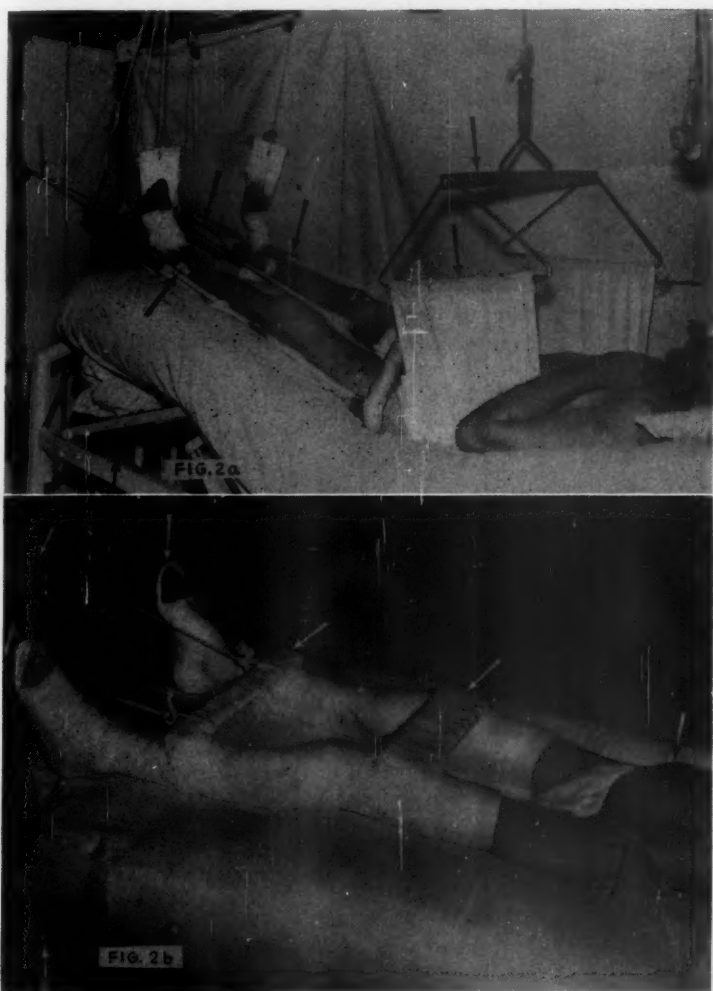
Fig. 2, a. Pelvic sling with Thomas splints and skeletal traction which have been applied to the lower extremities with a 20 to 30 pound weight post reduction to each leg as used in severe fractures of the pelvis as a convalescent traction following manipulative reduction of the fractured pelvis. Note the flexion of the thighs at the hip joint in a. Fig. 2, b. Show the later convalescent treatment of the complicated pelvic fractures with cast applied bilaterally to the lower extremities to the middle third of the thighs with plaster cast bars transversely applied as shown. Usually the original traction is demanded for about six or eight weeks and the convalescent cast as shown in Fig. b with traction for about four weeks after which time wheel-chairs may be allowed and weight bearing within about four months or thereabouts following the time of initial injury. (Key and Conwell: The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)

bodies of the pubis support the femoro-sacral arch and the united rami of the ischium and pubis support the ischiosacral arch. When an arch is subjected to strain, the tie arches are usually broken before the main arches are affected. Clinically, most fractures of the pelvic ring occur in the anterior portion (tie arches), and the posterior portion (main arches) is rarely broken without there being also a fracture of the anterior portion.

Fractures of the pelvis are not rare according to Noland and Conwell, who reported in Surgery, Gynecology and Obstetrics, February 1933, a series of 185 cases seen over a period of 12 years. That they are becoming more frequent since the automobile accounts for an ever increasing number of severe injuries. Many fractures of the pelvis are never diagnosed because they frequently occur in conjunction with other fatal injuries such as result from falls from a great height, in mining, railroad or automobile accidents.

Most fractures of the pelvis are caused by direct trauma such as heavy blows or severe crushing injuries. When the force is applied in the anteroposterior direction, the front of the pelvic ring (one or both rami) usually breaks first, and then if the force continues to act, the strong main arch is spread and the posterior portion of the ring is broken near the sacroiliac joint, usually on the same side as the fracture of the anterior arch. With lateral force, the same type of injury tends to occur, but the anterior ring is broken by being forced inward. In a fall upon the feet, with the force acting from below upward, the same sequence of fractures may occur.

One of the most common severe complicated types of pelvic fractures is the double vertical fracture of Malgaigne. Other fractures of comparative severity are multiple fractures of the pelvis involving the lower halves, causing ruptures of the bladder perineum, and deep urethra.

The relatively high mortality in fractures of the pelvis (16 per cent in Noland and Conwell's series) is due to the complications and associated injuries which are so frequent in these lesions. In those cases that die within the first 24 hours after admission, death is usually caused by crushing injuries of the abdomen and pelvis, with rupture of viscera and surgical shock, or by fractures of the skull or chest. In these patients the fracture of the pelvis is of secondary importance.

Fractures of the low spine are more common than generally believed as complications of the more severe complicated pelvic fractures, especially in that type of fracture where there is fracture-dislocation through the sacroiliac areas. Such types of fractures are
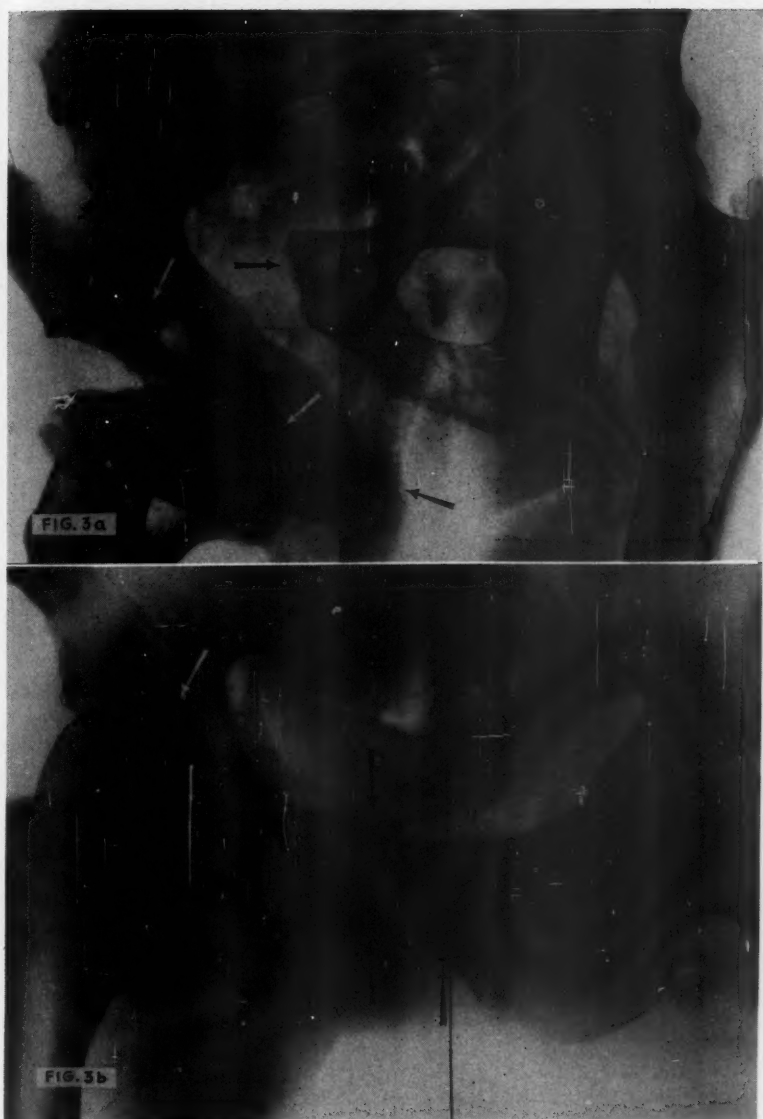
Fig. 3, a. Shows a severe fracture-dislocation of the left half of the pelvis and hip with marked downward displacement as well as a fracture dislocation through the acetabulum and hip on the right side. Fig. 3, b. Shows reduction following manipulative procedures under general anesthetic and treatment carried out during convalescence as described in Figs. 2 and 7. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)
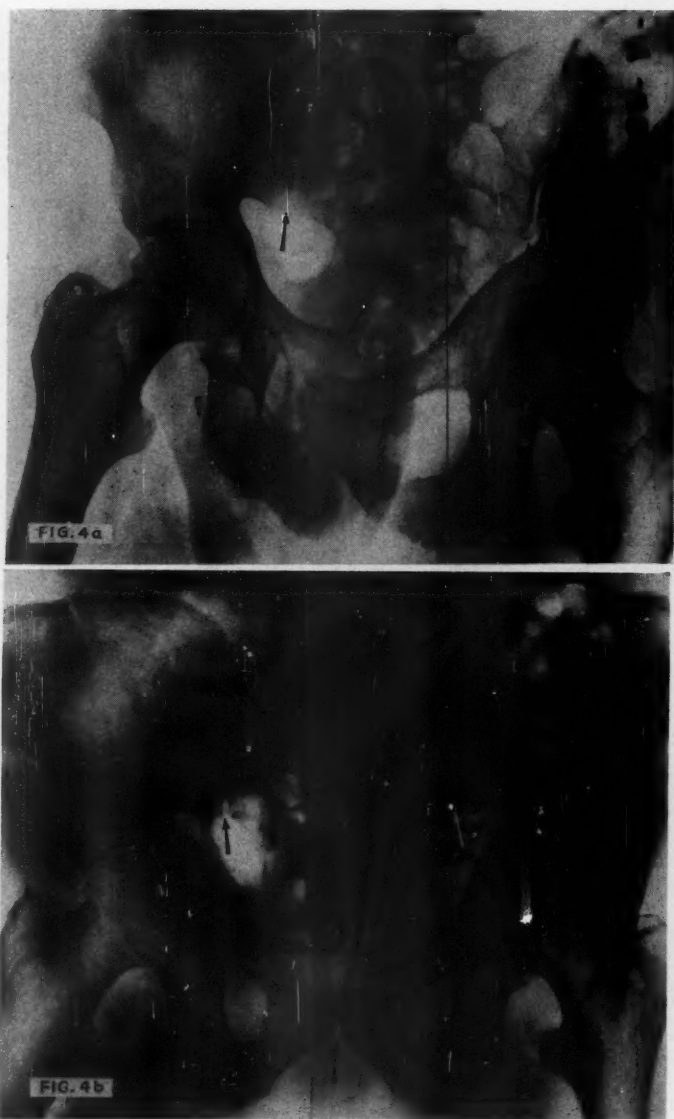
Fig. 4, a. Shows severe fracture-dislocation of the pelvis involving both the anterior and posterior portions of the ring of the pelvis, a most severe type of injury. Fig. 4, b. Shows anatomical results following manipulative procedures (fig. 7). Convalescent treatment carried out as described in figure 2. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)
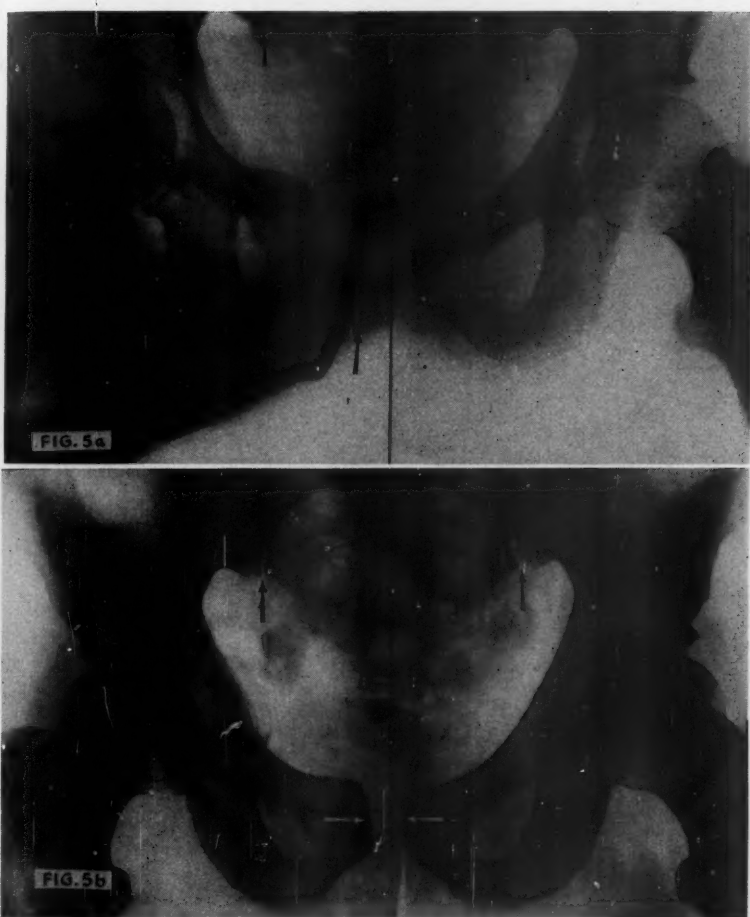
Fig. 5, a. Shows fracture of the pelvis with marked separation of the bladder. Blood in urine but no rupture of the bladder. Retention catheter was applied. There is also dislocation at the sacroiliac joints bilaterally. Fig. 5, b. Shows anatomical results following reduction and application of pelvic sling and convalescent treatment carried out as described in figure 2. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)

severe ones, indeed, and demand most careful surgical judgment and a minimum amount of surgery and manipulation for a maximum amount of relief and results. Certain manipulative procedures can be done to bring about a reduction of such type fractures as well as fractures of the lower half of the pelvis.

In certain instances it may be found necessary to do spinal fusions

Fig. 6, a. Shows fracture of the acetabulum with marked depressed central fracture. Fig 6, b. Results anatomically following a closed manipulative reduction with traction and counter-traction and skeletal traction unilateral only to the involved side and convalescent care carried out for eight weeks in traction, six weeks in plaster spica, weight bearing in four months with good results. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)
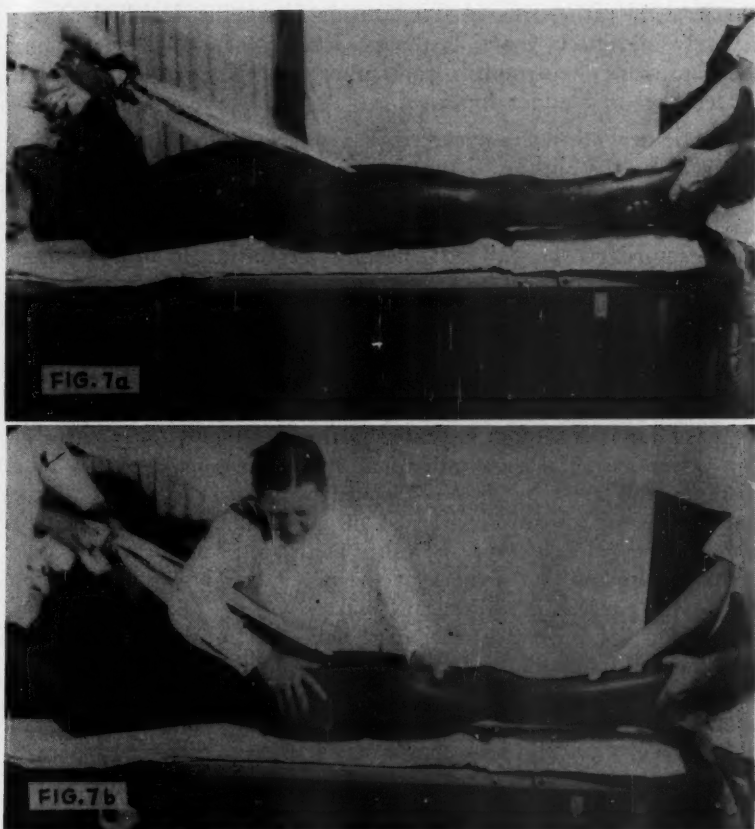
Fig. 7, a and b. Technic used by the author for reduction of fracture-dislocations of pelvic fractures. Fig. a. Shows traction being applied on the involved side to the lower extremity with counter-traction with sheet in groin on the opposite side. (Patient should usually be anesthetized.) Fig. 7, b. Traction and counter-traction carried out with manipulative procedures by the surgeon. (Key and Conwell, The Management of Fractures, Dislocations and Sprains, Fifth Edition, 1951, C. V. Mosby & Co., St. Louis, Missouri.)

in the lumbosacral and sacroiliac injuries but this type of treatment is seldom indicated. It has been done in less than 2 per cent of cases in the series reviewed by the author of his own cases. Injuries to the bladder, of course, are always to be given serious consideration as well as deep urethral injuries. Fortunately, ruptures of the bladder are relatively rare but, as stated before, they should be kept in mind, and injury to the bladder or deep urethra or perineum should be given grave consideration. It is remarkable in some instances, even in the severe type of pelvic fractures about the sym-

physis with rather marked separation, that the bladder is not severely injured in many instances, whereas, in relatively minor separations of the symphsis pubis, there have been relatively high percentages of bladder ruptures.

Sciatic nerve injuries occurred in about 4 per cent of the series observed by the author. These injuries usually should not be operated upon. All of the cases except one observed by the author recovered without surgery. A triple arthrodesis was done in this case, which improved the patient's disability, resulting in only a slight degree of limited function. Care, of course, should be carried out during the convalescence to protect the foot from the foot-drop position by proper support, which in itself will prevent, in many instances, unnecessary disability caused by negligent observation during the convalescent period of the patient.

Plaster cast is seldom indicated in the treatment of fractures of the pelvis, except when a patient must be transported over a long distance and must be moved frequently, or in a case where the patient cannot possibly be turned off of his back, which must be done to prevent bed sores and other associated complications. The actual treatment of fractures of the pelvis by plaster to hold the fracture in place is not practical. Plaster will not take the place, by any means, of the more efficient skeletal or Buck's extension and traction and pelvic sling. It is important to have some form of low back support during the convalescent period of these cases, for by so doing it will prevent in many instances a complication which would result in a low back strain, which is most difficult to cure, if allowed to continue without support.

REDUCTION IN HEMOGLOBIN CONCENTRATION AND IN RED BLOOD CELL COUNT FOLLOWING THORACOLUMBAR SYMPATHECTOMY FOR HYPERTENSION, WITH SUGGESTIONS FOR THE POSSIBLE USE OF THIS OPERATION IN POLYCYTHE- MIA VERA

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SYMPATHECTOMY of one type or another has been utilized for the last 17 years at the Medical College of Virginia for the relief of vascular hypertension. The first procedure employed was the Peet supradiaphragmatic operation, followed by the Smithwick and, latterly, by the Hinton technic. These last two surgical procedures are rather extensive thoracolumbar sympathectomies carried out bilaterally through a retropleural approach in two separate sessions and consist of removing the thoracolumbar sympathetic chain on each side from approximately the sixth or seventh thoracic ganglion to below the second lumbar, together with complete removal of the greater, lesser and least splanchnic nerves. In the present technic the celiac ganglion itself is left in situ.

For the last year or more we have noted fairly frequently a quite definite tendency for such sympathectomies to be followed in a few days by an undue lowering of the (1) red blood cell count and (2) hemoglobin content of the peripheral blood not only after the second stage has been completed but also between the two operative procedures in the same patient, *i.e.*, after the first stage only, when the blood pressure may be slightly reduced at most. This undue lowering of these two blood findings occurred even when there was extremely slight blood loss during the operation so that occasionally there was no gross blood visible in the suction bottle in the operating room at the conclusion of the operation. This tendency was noted in 8 cases during the calendar year of July 1949 to June 1950, in which period of time 40 patients were operated upon bilaterally for hypertension on our service. This inordinate apparent reduction of the red blood cell count following thoracolumbar sympathectomy was, therefore, seen in 20 per cent of the operated cases.

The question has arisen in our discussions why all of the hypertensive patients do not develop temporary anemia after thoracolumbar sympathectomy. The patients operated upon are in various stages of hypertensive disease. Possibly those with a high degree of vasospasm obtain more of a reduction in red cell count than do those with organic changes in the blood vessels, due to oxygen intoxication of the bone marrow.
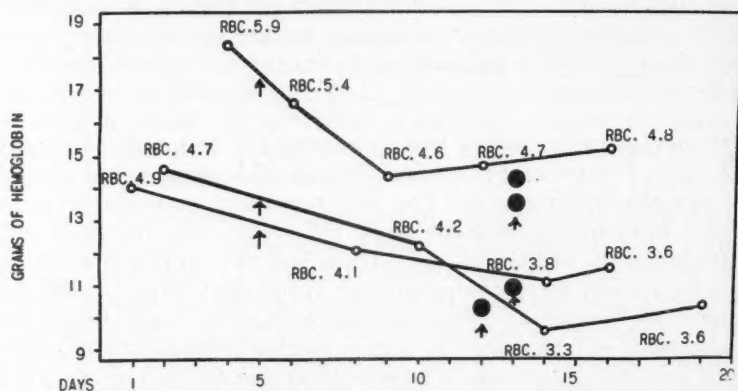

Fig. 1. Graphic representation of the reduction in red blood cell count and also in hemoglobin concentration of three representative hypertensive patients who had bilateral lumbodorsal sympathectomy. Hemoglobin concentration in grams per 100 cc. of blood is indicated on the ordinate line and the red blood cell count in millions per cu. mm. is shown by numbers on the three graph lines at each determination. Days are shown at the bottom. Day of operation is indicated by a large arrow and the number of pints of whole blood transfusions is indicated by large solid circles (see text for interpretation).

The accompanying graph (fig. 1) is a composite curve of 3 hypertensive patients on each of whom bilateral thoracolumbar sympathectomy was performed. In all 3 cases, and there were 5 other similar ones on our Neurosurgical Service in the calendar year during which these 3 patients were observed, there is a significant fall in (1) hemoglobin percentage, as determined in grams per cent, and also (2) in red blood cell count after the first stage was carried out, the other side still being entirely intact. These laboratory determinations were made from one to seven days postoperatively. Following the second-stage operation (even though a pint or more of blood was given in each of the 3 cases during the second-stage procedure to support a neurogenic drop in pressure rather than to replace acute blood loss, and to more than compensate for the slight blood loss occurring during this operation), the lowered level of hemoglobin content and red blood cell count persisted considerably below the preoperative determinations of both these values (fig. 1).

The postoperative hemoglobin and red blood cell determinations, just referred to, were also made from one to seven days after the second-stage procedure.

The results of the studies reported by Freis and Smithwick[1] in 1947 concerning the effect of lumbodorsal sympathectomy and splanchnicectomy on the blood volume and the thiocyanate space in 10 patients with essential hypertension revealed (in 9 of the 10 patients studied) a decrease in red cell volume as manifested by a fall in the hematocrit reading in a period from eight days to two weeks after operation. In 1948, Davis and Mayerson[2] published their findings of blood studies in 20 patients with hypertensive vascular disease before and after sympathectomy. They found no consistent long-standing postoperative changes other than immediate decrease in the red cell mass with a tendency toward delayed recovery. Furthermore, it was noted that the 5 patients who had exceptionally poor postoperative results, so far as reduction of blood pressure was concerned, all had low circulating red cell masses before operation. Simeone and Ramirez,[3] in 1950, concluded from their studies on the effects of lumbodorsal sympathectomy for hypertension that, although there was a drop in the hematocrit value early after operation with return to normal later on, nevertheless they believed the total red blood cell volume remains within the preoperative limits because of associated changes in the plasma volume.

There are a number of reports of clinical and experimental studies in the literature which indicate that the sympathetic nervous system has an influence upon hematopoiesis. Evidence that stimulation of the central nervous system component of the sympathetic nervous system in the frontal lobes or in the cerebellum encourages hematopoiesis is suggested in the following instances: Oppenheimer,[4] in 1929, reported a case diagnosed clinically as polycythemia vera which at autopsy was found to have a medulloblastoma of the cerebellum. In 1936, Meiner's[5] report was published of a patient with a glioblastoma multiforme of the right cerebral hemisphere with a red blood count of 8,500,000 which dropped to 5,500,000 following roentgen therapy. Also Walker[6] reported, in 1945, 2 cases of hemangioblastoma of the cerebellum with associated absolute polycythemia which in each instance disappeared following extirpation of the tumor. Also, 1 of his 2 cases had a blood pressure of 160/120 mm. Hg. which returned to normal after operation. It is now known that the frontal cerebral cortex[7] has sympathetic nervous system representations and the cerebellum[8] has an influence upon vasomotor reflexes. It is not surprising that there are relatively few reports of this kind in the literature since neo-

plastic lesions anywhere in the body usually produce depression or destruction of function rather than stimulation.

Furthermore, experimental research has yielded additional evidence of the influence of the sympathetic nervous system upon hematopoiesis. Davis and Harris[9] and Davis,[10] in 1942, studied the effect of sympathomimetic drugs and they have actually produced polycythemia by daily administration of epinephrine and amphetamine in dogs, rabbits and man. In 1943, Mettler[11] reported that bilateral frontal cerebral cortical ablation in dogs was followed by a reticulocytosis and no such response was found following bilateral occipital cortical ablation. Schafer,[12] in 1945, while studying neurogenic hypertension, found that 6 of 13 dogs subjected to proprioceptor depressor neurotomy (removal of principal parasympathetic influence) showed pronounced increase in the red cell mass (polycythemia), whereas dogs on which extensive sympathectomies were performed showed a definite decrease in the red cell mass, just as did our patients with hypertension reported in this paper. Moreover, extensive bilateral paravertebral sympathectomy resulted in a disappearance of the polycythemia in those dogs with "post-depressor nerve neurotomy" polycythemia, and also in 1 case of an adult male patient with polycythemia rubra vera. In the case of the human subject, the return of the polycythemia postoperatively after bilateral thoracolumbar sympathectomy and splanchnicectomy paralleled the return of sweating to the denervated skin areas.

In studies recently reported by one of us with colleagues[13] polycythemia was produced in cats following chronic stimulation of suprasegmental autonomic centers with metrazol.

These findings suggest that the reduction of the red blood cell count and hemoglobin content following lumbodorsal sympathectomy and splanchnicectomy in man (which first excited our interest clinically) is the result of removal of sympathetic vasomotor influence upon the blood vessels of the bone marrow and is not primarily due merely to blood dilution incident to postoperative vasodilatation. The gradual return to the preoperative values of the red cell mass appears to parallel the recovery of sudomotor function in denervated skin areas following lumbodorsal sympathectomy, as has been shown by Ray and Console[14] in 1948. This indicates that the effect on the bone marrow of vasodilatation and hence increased oxygenation (such as follows sympathectomy for hypertension in man) is the same as occurs in oxygen intoxication at atmospheric pressure,[15] namely, a relative depression of hematopoietic function, which we believe is the chief factor in the reduction of red blood count and hemoglobin content in our hypertensive patients postoperatively, as reported in this paper (fig. 1).

Conclusions

The clinical observation has been made in a series of patients on whom extensive bilateral thoracolumbar sympathectomy and splanchnicectomy was carried out for hypertension, that an inordinate drop in red blood cell count and also in hemoglobin content developed both after the first and after the second-stage procedures, these findings appearing within a few days of the operation.

It is believed that this interesting observation is based chiefly on the fact that following extensive sympathectomy there is an increased oxygenation of the bone marrow incident to vasodilatation in the bone marrow, thus resulting in a temporary relative depression of hematopoietic function (*i.e.*, oxygen "intoxication" at atmospheric pressure, and its depressant effect on hematopoiesis).

Such findings have also been demonstrated in human polycythemia vera after extensive bilateral sympathectomy to such an extent that this operation may be beneficial in the treatment of this distressing disease, as suggested by Schafer,[12] particularly in reducing the red blood cell count and hematocrit estimation, at least temporarily.

The theories based on clinical and experimental observations utilized to explain these interesting findings are reviewed.

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PRIMARY CARCINOMA OF THE APPENDIX*

Report of a Case

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A MONG the early writings about carcinoma of the appendix are many cases reported which are now thought to be carcinoids of the appendix. Earlier, both the surgeon and pathologist grouped these as one. Although many authors today believe that carcinoma of the appendix is a common finding,[6,7,8] Uihlein and McDonald of the Mayo Clinic found only 5 cases recorded from 1910 to 1941.[4] Young and Wyman stated that only 4 authentic cases could be found in the literature from 1932 to 1942,[2] while, on the other hand, Van Alstine and Vance report that carcinoma of the appendix occurs in 0.5 per cent of all appendices surgically removed.[6,7] It is possible, however that these two authors included all primary tumors of the appendix.

Grossly, carcinomas of the appendix are usually divided into two groups, namely: polypoid and ulcerative,[4] while microscopically they may be divided into alveolar or glandular, undifferentiated, and mucous carcinomas. They are usually of low grade malignancy but otherwise similar to other carcinomas of the gastrointestinal tract.[8]

It has been stated that the carcinomas of the appendix give no particular symptoms, but may at times give signs and symptoms of acute appendicitis and may cause perforation and generalized peritonitis.[2,4,5,7,8] Most carcinomas of the appendix will, therefore, grow sufficiently to cause obstruction of the lumen of the appendix and thereby produce an acute inflammatory process.

Carcinomas of the appendix are usually found at surgery for other surgical procedures. The most common site of the carcinoma within the appendix is thought to be the base.[4,5] At surgery an acutely inflamed appendix is found with a mass at its base; however, some are not suspected until microscopic examination is done.

Because of the rarity of this condition, a case of primary carcinoma of the appendix is being presented. The tumor was located in the midportion of a grossly, acutely inflamed appendix. The inflammatory process extended well up onto the cecum, and there was a small perforation of the cecum at the base of the appendix.

CASE REPORT

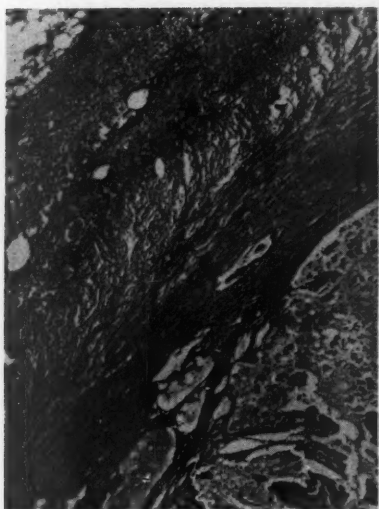A 79 year old white male was admitted to the hospital with a 12 hour his-

Fig. 1. Low power view of appendix showing all layers of the appendix. Type of carcinoma is easily seen and in this section only minimal submucosal involvement is seen. Throughout all layers, numerous inflammatory cells can be seen.
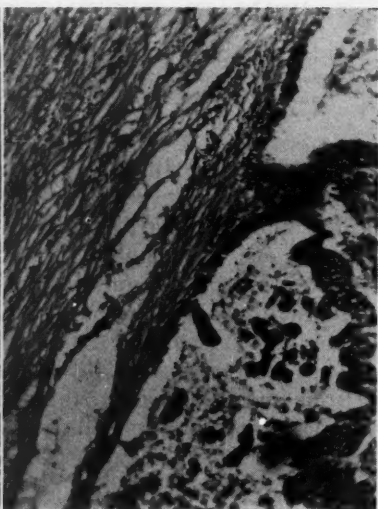
Fig. 2. High power view showing character of carcinoma with no evidence of invasion of submucosal layer. Inflammatory cells can be seen in submucosa.

Fig. 3. Showing minimal submucosal invasion. The mucoid character of carcinoma is seen.

Fig. 4. A high power view showing the papillary nature of carcinoma.

tory consistent with that of acute appendicitis. The patient was under the care of a physician for a rather severe hypertensive cardiovascular disease. There was no history of weight loss, or change in bowel habits that was suggestive of malignancy.

Upon examination rigidity was found in the right lower quadrant. A small mass approximately 4 cm. in diameter was palpable. This mass could be moved about.

Initial temperature was 101 F. Laboratory findings were as follows: red blood cells 3,900,000 with 63 per cent hemoglobin; white blood cells 21,000 with marked shift to left. Urinalysis was negative.

Preoperative diagnosis of acute appendicitis with perforation, plus mucocele or carcinoid of the appendix, or perforation of malignancy of the cecum, was made. The first seemed most likely since there had been no history of loss of weight, and the laboratory findings were not consistent with that of a malignancy of the cecum.

The abdomen was opened through a McBurney incision, and a generalized peritonitis was found. The appendix was found in the lateral gutter densely adhered to the cecum. The base and the tip of the appendix were swollen, but there was a tumor mass located within the midportion of the appendix. This mass was well circumscribed and measured approximately 4 cm. in diameter. The serosa had not been invaded. The entire appendix and cecum were grossly and acutely inflamed. Just at the base of the appendix there was a linear perforation of the cecum. The appendix was removed and the perforation together with the base of the appendix was inverted. No mass within the cecum or enlarged lymph nodes could be found. The patient made an uneventful recovery.

Microscopic examination of the appendix revealed a fairly well differentiated adenocarcinoma with mucoid degeneration of the appendix confined for the most part to the mucosa and submucosa, but few areas showed penetration into the muscular layer. No section showed penetration as far as to the serosal layer. Sections of the base of the appendix were free of tumor. Also seen in all sections was an acute inflammatory process (figs. 1, 2, 3, 4).

The patient was seen at periodic intervals following surgery, and at no time revealed evidence of residual disease. Approximately two years following surgery, the patient expired following what appeared to be a cerebrovascular accident. Autopsy was not permitted.

A right colectomy was contemplated in this case, but because of the patient's age and cardiac status, and because of all indications that the tumor was entirely confined to the appendix, this was decided against. Although the patient was 81 years old at the time of his death, he remained in fairly good health and had no symptoms referable to his gastrointestinal tract.

SUMMARY AND CONCLUSIONS

1. A brief resume of the literature is given on this subject.

2. A case of primary carcinoma of the appendix, which is well confined chiefly to the mucosa and submucous, with an acute inflammatory process causing perforation of the cecum, is presented.

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EVALUATION OF THE S. M. O. METALLIC HEAD

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THE use of foreign material in surgery has been securely established by many surgeons, most notably Dr. Smith-Peterson with his vitallium cup in the acetabulum, some of which have been very satisfactory for years. The acrylic cup has been used extensively in France and at present in the United States by Drs. Thompson, McBride and others. The use of metal plates, nails and screws have proven their efficiency during the past years.

From Baltimore, the reports on cups are not so promising—the acrylic cup proving unsatisfactory in the long run. The collision metallic head has been used successfully with only a few accidents such as breakage of the nail. This was reported by Dr. Peterson at the last A.O.A. meeting in Virginia Beach, Virginia. The metallic S.M.O. head here described was developed by Dr. Frank Lorenzo and its use has been limited exclusively to our clinic at the Allegheny General Hospital in Pittsburgh, Pennsylvania, in an attempt to establish its worthiness in surgery of the hip joint and what contribution it can make toward the rehabilitation of the patient.

We are reporting results following this operation which was done for the first time January, 1950, and has proven quite satisfactory in the treatment of fractures of the neck of the femur with destruction of the head due to comminution or aseptic necrosis. The report on the use of the metal head in other pathological lesions will have to wait through a very critical period before recommendations are made by us. The only comment at the present time is that they are very satisfactory after a six to eight months period, but this is not sufficient time to establish a criterion. We believe at the present time the S.M.O. head is incomparable in relieving pain in the aged patient with an un-united fracture and absorption of the neck of the femur and not enough can be said concerning the rapidity with which this is accomplished. Justification for its use in other types of pathological lesions is still to be proven and we are in that process at the present time. Sufficient length of time has not elapsed to determine its efficiency in younger aged groups.

We have used this metallic S.M.O. Head in the following:

1. Anchylosing arthritis.

2. Un-united fractures of the femoral   k and head with absorption of the neck.

(a) Dead head—aseptic necrosis.

(b) Un-united fractures of the head.

3. Old slipped epiphysis.

4. Anchylosis due to suppurative arthritis.

5. Tuberculosis apparently healed.

6. Old congenital dislocation of the hip joint.

7. Charcot hips.

8. Osteo-arthritis.

9. Gunshot wounds of the neck and head of the femur with marked shortening.

Advantages.

1. Regain length.

2. Early use without fear.

3. Early rehabilitation.

4. Non-painful.

Fig. 1. Shows amount of shortening of   Fig. 2. Shows insertion of the S.M.O.
           the shaft.   head and correction of shortening.

Precautions. In those cases where undue shortening occurs (fig. 1) and it is desirable to obtain length, the first stage consists of preliminary loosening of the upper portion of the femur, freeing it from all attachments by operation and, if feasible, deepening of the

acetabulum. Close the incision, put the patient to bed and apply extension and counter extension until the shaft is pulled down to the desired length. This usually takes two weeks, and greatly reduces the chance of shock.

The second stage consists of the application of the S.M.O. head and plate with locking and fixation bar which gives double strength in the angle (fig. 2). The angle can be varied to suit the patient's needs. None of these heads have shown any loosening or breaking of the plate, bar, head or screws. The general condition and age of the patient, and whether lengthening is to be accomplished, govern whether the operation is to be done in one or two stages.

Results are very satisfactory. All the patients walk (figs. 3, 4). The amount of motion obtained is commensurate with the age of the fracture; that is, the older the fracture the longer it takes for rehabilitation. (It is impossible to take musculature that has been more or less dormant for years and expect the patients to arise, take up their beds and walk.) It is unlikely in the older patients that we will be able to give final judgment on the length of time the S.M.O.

Fig. 3. S.M.O. head in place. Patient walking after 1¾ years after insertion. This patient had been bedridden for 2 years before operation.

Fig. 4. S.M.O. head in place, but not in contact with femur, holding firmly, 1½ years after operation.

head will be useful. We do know it is definitely right as long as they live, for the relief of distress and pain. Practically, it enables them to return to their normal method of living.

What influence it will have on the bony or cartilaginous acetabulum, can only be established by following the younger group of cases for a period of years.

Fig. 5. S.M.O. head in place. This patient had Strumpell-Marie arthritis with ankylosed hips.

Rehabilitation consists of early motion (active), heat and massage, muscle training, and correction of bad habits in walking. The rapidity with which complete or near complete rehabilitation takes place depends on the age of the patient and the duration of the disease (un-united fracture). Bearing in mind that some of these pathological lesions have been present during the entire life of the patient (fig. 5).

Technic of Operation. An incision is made extending from the anterosuperior spine of the ilium, obliquely downward to the great trochanter of the femur and is then extended a sufficient distance down the shaft from the trochanter to assure easy application of the plate. Dissection down to the head and neck of the femur having been accomplished, all bleeding points are tied, leaving the head, neck and upper third of the shaft of the femur exposed. The capsule is incised and the diseased head removed by means of a gouge or a chisel driven straight into the center of the head, using this as a lever to pry the head out. This is very simple, quite easy, and not shocking. All remaining neck should be preserved on the shaft. Scar tissue and capsule are removed as thoroughly as possible.

We are now ready for the insertion of the pin through the shaft
and neck at approximately the same angle as the original or slightly
more acute. A wire is drilled through the shaft at the desired angle.
A drill is then fitted over the wire, the same size as the bolt or shaft
to be inserted, and drilled through with the electric saw.

The plate is applied loosely to the bone. The new shaft or bolt is
run through the bone plate into the opening made by the drill in
the bone. We are now ready for the S.M.O. head which is slightly
smaller than the acetabulum. This is introduced into the acetabu-
lum and controlled by a handle, or two handles, screwed into it so
that easy application to the screw is made possible. The head is
fitted over the screw and the screw turned into the S.M.O. head as
far as desired. The head is then locked in this position by two
setscrews which are turned under so that no weight is borne on
the setscrews. At this stage, it is possible to increase the length of
the neck to allow the head to rest on the remaining portion of the
neck. The lock for the bolt is then applied over the head and fitted
on the plate in proper position. This is locked to the head, plate
and bone by special threaded screw holes in the upper portion of
the plate. The bone is drilled through all plate holes by a small
drill attached to an electric saw, thus taking some of the labor out
of the operation. Special screws are used to fit through the lock
and threaded plate into the shaft. These are screwed tight by special
long-shafted screw holders attached to a hand drill. This greatly
facilitates the operation. It is advisable to have at least four of
these drills available (six is better) before operation. The incision
is closed, deep parts with No. 2 catgut suture and No. 1 catgut in
fat and fascia. The skin is closed with a locking stitch of waxed,
braided silk. Sterile dressings are applied and then sterile sheet
wadding is placed around pelvis and thigh. Over this, a firm ban-
dage, made of muslin 6 inches wide, is applied in the shape of a
spica. Occasionally, a thin layer of plaster bandage is placed over
the muslin to hold it in position. No further fixation is required.
The patient is placed in bed with the leg in abduction and the knee
slightly flexed over the pillow to lessen the tendency to external
rotation. The hip is moved daily at least once and movement in-
creased each day until sutures are removed at the end of a week or
10 days. At that time, the patient is allowed up on crutches and
permitted to walk as soon as he can be persuaded to use a cane;
then, as muscular development occurs, to walk as before without aid.

Instruments required.

S.M.O. heads come in three sizes, large, medium, and small.
Bolts—three lengths all the same caliber.

Hand drills—four to six.

Electric saw—rotating.

S.M.O. plates with six holes for screws. The top two holes threaded for fixing lock.

Screws—length to suit width of femur.

Drill—7.64 inch drill points.

Screwdrivers—four to six. It is important that they fit in chuck of hand drills.

Results in 20 cases. First case done in January, 1950. Oldest, 66 years. Youngest, 20 years. Average between 40 and 50 years. Twenty-five per cent motion at start, gradually increases. Definitely for the aged where operation is feasible. Oldest age of fracture, six years; youngest, two years. Longest duration before operation, 25 years, dislocated hip.

THE POSTERIOR MONTEGGIA FRACTURE

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A ¡FRACTURE of the proximal end of the ulna associated with an anterior dislocation of the head of the radius, was first described by Monteggia[4] in 1814. Since then the "Monteggia fracture" has become a well-known clinical entity.

However, a particular type of this fracture, namely, that associated with a posterior dislocation of the radial head, and a dorsal bowing of the ulna, is not so well recognized. Very little reference to this type of fracture is to be found in the literature. Naylor[5] described 1 case in a series of 9 Monteggia fractures. Speed and Boyd,[9] in a series of 62 Monteggia fractures, stated that the dislocation of the radial head was anterior in 83 1/3 per cent of the cases; posterior in 10 per cent; and lateral in 6 2/3 per cent.

In a recent article, Penrose[6] describes 7 cases of posterior dislocation of the head of the radius in a series of 10 Monteggia fractures. Smith[8] states that posterior angulation of the shaft of the ulna and dislocation of the radial head posteriorly, almost always leads to a fracture of the head of the radius. This, he believes, is an entirely separate entity from a Monteggia fracture.

One hundred and ninety-seven cases of fracture of the radius and ulna were studied at the University of Virginia Hospital. In this group, 14 cases of typical Monteggia fractures were found. Of these 14 cases, 3 cases were the posterior Monteggia type.

One other case was found to demonstrate a posterior bowing of the ulna and posterior dislocation of the radial head. This case was not included, however, because the fracture-dislocation was primarily of the anterior type when sustained, and posterior angulation of the ulna and radial head occurred at a later date, possibly due to over zealous manipulation or loss of position in the case.

Age, Sex and History. Two of the patients were females, aged 42 and 63. One patient was a male aged 25. Two of the fractures involved the right arm and 1 the left arm. One of the fractures was badly compounded.

The history in all of the cases was vague as to exact details. There was no exact description of the type injury, the patient merely stating that he received a "blow" or fell on the elbow or forearm. Two of the cases were "side-swipe" injuries of the arm sustained in automobile accidents. One case was the result of a fall on the forearm.

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Pathology. Two of the cases presented comminuted fractures of the ulna very near the elbow joint or olecranon process. One case was at the junction of the proximal and middle thirds of the ulna and was oblique. An irregular and variable sized anterior fragment may frequently be detached from the ulna. Posterior angulation of the ulna is the rule.

In only 1 case in this series could a fracture of the radial head be detected. One case did have a fracture of the capitellum of the humerus. One of the cases, inspected at operation, revealed an intact radial head and humerus. It is recognized that a fracture of the anterior margin of the radial head may frequently be present. Also a fracture of the capitellum of the humerus is often found.

The dislocation of the radial head ruptures the annular ligament, and a posterolateral or posterior rent in the capsule may be present.

Mechanism of Injury. It is often assumed that a forceful blow over the dorsal surface of the proximal ulna produces the anterior type Monteggia fracture. If this is the case, it might logically be assumed that a force exerted on the anterior surface of the prox-imal forearm might produce the posterior Monteggia fracture.

Penrose, however, has demonstrated that this fracture can be duplicated, in anatomical specimens at least, by an indirect force exerted on the distal radius and ulna.

He fixed the bones of the arm, including the humerus, radius and ulna to a frame, in such a manner that the forearm was in moderate pronation and 120 degrees extension. It was felt that this was fre-quently the position of the arm in a fall. A strong blow was then delivered over the sawed-off ends of the distal radius and ulna. This produced a simple posterior dislocation of the elbow as might be expected. When the proximal ulna was notched, to weaken it, however, and the experiment repeated, a rather striking posterior type Monteggia fracture was produced. This included posterior bowing of the ulna and a fracture of the anterior margin of the radial head with posterior dislocation.

Penrose believes that the posterior Monteggia fracture may represent a variation of a posterior dislocation of the elbow in which the ligamentous attachments about the elbow are stronger than the shaft of the ulna. As a result, the ulna fractures. In a simple dis-location, the reverse is the case. It appears, however, that the frac-ture of the radial head may not be present in all cases.

Treatment. Conservative treatment consisting of manipulation of the fracture and restoration of the radial head may sometimes succeed. Most of the fractures will require operative intervention.

Fixation of the fractured ulna may be complicated by the degree of comminution, proximity to the elbow joint and olecranon process. As a rule a plate, intramedullary pin, screws or wire are used, depending on the type of fracture.

If the fracture involves the radial head, excision of the fractured portion may be all that is necessary with restoration of the bone in its normal position. If the fracture involves very much of the radial head, excision of the entire head is required. A detached fragment of bone from the capitellum of the humerus must be removed. Suture of the rent in the capsule is also done.

Watson-Jones has suggested immobilization of these fractures in extension. Two cases here were treated with the arm immobilized in flexion and moderate supination. This appears to immobilize the fracture well and hold the radial head in position.

CASE REPORTS

CASE 1. J. S., a 25 year old colored male, was driving a car with his left forearm leaning out of the window. Another car "side-swiped" his car, striking his left forearm. Examination revealed a deep laceration of the skin and tendons over the dorsum of the mid forearm. In addition there was a ragged wound over the posterolateral surface of the forearm with the radial head visible behind the distal end of the humerus. The ulna was fractured at the junction of the proximal and middle thirds and projected through the skin on the dorsal surface. Roentgenograms (fig. 1) revealed the posterior angulation of the fractured ulna and the posterior dislocation of the radial head. The patient was taken to the operating room where the wounds were debrided. The radial head was intact and restored in its position. The fractured ulna was approximated. No metal was used. All wounds were sutured and the arm enclosed in a long arm cast in 90 degrees flexion and moderate supination. The patient did remarkably well and in three months had practically a perfect elbow. The ulna had united and the radial head remained in normal position.

CASE 2. F. L., a 63 year old white female, tripped over a log and fell on frozen ground. The history states that she struck her left elbow.

Examination revealed marked swelling and dorsal angulation of the proximal ulna. Any attempts to move the arm were painful. Roentgenograms (fig. 2) revealed a comminuted fracture of the ulna just distal to the elbow joint. The fracture involved the coronoid process of the ulna. In addition, a fracture of the lateral articular surface of the humeral condyle was present. The radial head was dislocated posteriorly behind the capitellum of the humerus. The fracture was treated primarily in side arm traction. A manipulation of the fracture under general anesthesia was then done, followed by application of a cast. This improved the position of the fracture slightly. The fracture deformity persisted, however, and was not corrected. Operation was advised, but refused. The radial head was still posterior, according to the last roentgenogram. The patient subsequently had marked limitation of flexion in the elbow and had a poor result. Five months later she wrote that the elbow could be "flexed to the waist" and her fingers were rather stiff.

CASE 3. L. S., a 42 year old female, stated that she was in an automobile

Fig. 1. Case 1. Posterior Monteggia fracture. Roentgenogram shows posterior bowing of ulna fracture. Posterior dislocation of radial head.

Fig. 2. Case 2. Posterior Monteggia fracture of left elbow. Roentgenogram shows fracture of anterior olecranon with posterior displacement of radial head. Fracture not fully reduced. Operation refused. Patient fell on left elbow.

Fig. 3. Case 3. Posterior Monteggia fracture of right ulna at olecranon with posterior dislocation of radial head. Had old injury of elbow (type not determined) 15 years previously. Roentgenogram shows fracture of olecranon with posterior dislocation of radial head. Fracture of capitulum. Old.

accident and was struck on the right elbow. No specific details were given. She developed pain and deformity in the elbow. Significant in the patient's past history was an injury to the elbow 15 years previously. She thought it may have been fractured, but this was not confirmed. At any rate there was marked limitation of flexion before the present injury. Roentgenogram revealed a fracture at the front of the olecranon process with dorsal angulation of the ulna and posterior displacement of the radial head. Also there were several loose fragments of bone about the radial head which appeared to be fractured off the lateral condyle of the humerus. The radial head appeared to be slightly deformed and this may have been an old fracture. Open operation and wiring of the fracture was advised, but refused. No follow-up was available on the patient but, undoubtedly, a poor result was present.

CONCLUSIONS

1. The posterior Monteggia fracture is described and the litera-

ture reviewed. Posterior dislocation of the radial head is said to occur in 10 to 15 per cent of the cases. Penrose reported 7 posterior-type fracture-dislocations in a series of 10 Monteggia fractures.

2. One hundred and ninety-seven cases of fractures of the radius and ulna were reviewed in this article. Fourteen typical cases of Monteggia fractures were found. Three of these were posterior-type Monteggia fractures. One other case presented a posterior dislocation at a later date, but was discarded because the primary injury caused a typical Monteggia fracture of the anterior type.

3. The posterior Monteggia fracture is more common in adult females.

4. Posterior angulation of the ulna is the rule. The ulna fracture is comminuted and may be near or in the elbow joint. The radial head often has an anterior marginal fracture. Some cases may have no fracture of the radial head. A fracture of the capitellum of the humerus is often present. Rupture of the annular ligament and a tear of the capsule are frequently found.

5. The history is seldom detailed. Automobile accidents appear to be the principal cause.

6. An indirect force exerted on the ulna and radius with the arm in moderate pronation and 120 degrees extension may cause the fracture, as demonstrated in an experiment by Penrose, using an anatomical specimen. The fracture bears a resemblance in some cases to a posterior dislocation of the elbow.

7. Operative treatment with fixation of the ulna and restoration of the radial head is often necessary and gives the best results.

8. Three cases are presented.

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NURSES AND THEIR TRAINING

Speakers at the commencement exercises of nurses' training schools frequently refer to the nurse as the "doctor's strong right arm," an expression with which members of the medical profession are inclined to agree. Certainly we would be materially handicapped if deprived of the nurses' assistance, and indeed could scarcely practice the medicine of today at all without it. Therefore we are vitally interested in knowing that nurses receive the best possible preparation for the part they are to play.

Young women who devote their lives to the care of the sick are to be highly commended and praised. They choose a career requiring considerable study and often hard work, long hours and sacrifice. Many of them could find less arduous employment with better pay and more security for the future. But she who is genuinely in love with her profession, and counts service for others above ease and material profit, seldom abandons her high calling for more lucrative fields. God has made no nobler creature.

Members of our profession should be the last to object to any change in the training of nurses regarded by the leaders of nursing

education as necessary for the advancement of their profession. The history of medicine for the past century has been a steady march of progress in which agents and methods esteemed as best by one generation give way to new and more successful means by the next generation. In what condition would the health of the world be at this time if medicine was practiced as in the era before Lister? Nursing of today is a far cry from the simple though efficient lessons taught 100 years ago by the greatest of all nurses, Florence Nightingale.

Due to varying factors, it is becoming more difficult to obtain a sufficient number of nurses for hospital and home needs, so it must be that the people who advocate a radical change in the education of nurses, and the creation of two classes, "professional nurses" and "practical bedside nurses," have reasons to support their contentions. Certainly such a system should not be condemned without understanding it and giving it a trial. The American Surgical Association has gone on record as approving the use of personnel trained specifically for bedside care. In many places short courses for such training are being carried out. It must be remembered, however, that despite theories and favorable arguments, the final test of the worth of any new idea is time.

In the meantime we are told that the training schools with acceptable three-year courses will graduate young women to be directresses, supervisors, nursing educators, social service workers and the like, and not bedside nurses. Will there be a sufficient number of such positions for the members of such classes to fill? And if we are sick at home, will such graduate nurses be willing and prepared to take care of us, or must we be satisfied with only the services of a "bedside nurse"? In the many papers which have been published on the subject, the whole function and the limitations of the "professional nurse" have not been clearly defined.

The establishment of the new set-up appears better suited for large university-connected institutions than for the many smaller hospitals throughout the country which up to the present time have turned out satisfactory nurses. The ultimate conception of the nursing educators is that the school of nursing should be a separate organization from the hospital, which sounds strange to us. How can nurses be taught their work without contact with patients, and plenty of contact with lots of patients? The proposal is in line with the teaching of medicine many years ago when the students were supposed to learn from charts and didactic lectures, and hardly ever saw a patient.

Unless a hospital is heavily endowed, or is maintained by taxa-

tion, it must be supported mainly by the fees of the patients, and are these patients to be given attention second to the education of nurses, whether viewed from a business or humane angle? The answer seems to be *no* in a case in which a nurse under orders leaves an operation in the middle of the procedure, to attend a lecture, and the operation is forced to cease while she counts the sponges, an incident which occurred recently!

So it appears that the doctor's "strong right arm," which he has cherished and esteemed so well and so long, has been disconnected from him. He seems to have but little contact with it, and certainly has no control over it. Is this best for the interests of all parties concerned? Should not surgeons and physicians at least be consulted about the program of the training of nurses? We believe that the curriculum for graduate nurses should emphasize instruction at the bedside and in the operating and delivery rooms rather than in the lecture room. We favor the highest education which anybody and everybody can absorb, but the nursing of sick people is an intensely practical business, and should be taught from a practical standpoint. However, in this changing world, it might be shown that the present trend in the training of nurses is right and necessary. We will not be bound by old ideas and traditions, and are open to conviction.

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BOOK REVIEWS

The Editors of The American Surgeon *will at all times welcome new books in the field of Surgery and will acknowledge their receipt in these pages. The editors do not, however, agree to review all books that have been submitted without solicitation.*

PEPTIC ULCER: CLINICAL ASPECTS, DIAGNOSIS, MANAGEMENT. By DAVID J. SANDWEISS, M.D., F.A.C.P., Associate Attending Physician, Div. of Internal Medicine, Harper Hospital, Detroit, Mich. Philadelphia, W. B. Saunders Company, 1951. $15.00. Cloth binding. 790 pages. Illus.

This is the most complete work on the peptic ulcer that we have seen. It is certainly the latest and best information from the finest and best informed physicians and surgeons of our day.

The book is divided into eight sections. Each section is scholarly and concise in portraying its message. The anatomy, physiology, pathology, medical and surgical management is covered in an orderly manner which does honor to the editor and his staff. The complications and sequelae of peptic ulcers are also included in these discussions.

The book is nicely impressed on semi-gloss paper. The illustrations are, for the most part, good. The style, of course, varies in each chapter because of the numerous authors but is easily readable throughout the book.

This book should be owned by every physician or surgeon who attempts to treat peptic ulcers.

A. H. LETTON, M.D.

PRINCIPLES AND PRACTICE OF OBSTETRICS. By J. P. GRENHILL, M.D. Atlanta, J. A. Majors Company, ed. 10, 1951. $12.00. 1,020 pages.

This new edition is excellently written. It is very easily assimilated, and the contents of the book have been almost completely rewritten.

The book features many of the newer advances in the practice of obstetrics, including valuable discussions of fetal erythroblastosis and an excellent section on the newer types of anesthesia, particularly that of saddle block anesthesia by Dr. Adriana. The entire field of obstetrics, with its many complications, is discussed. This book cont u.. all the new material about antibiotics, including terramycin, aureomycin and the others, as well as a helpful discussion of their use in combination. The illustrations are magnificent and would be very useful in the management of many of the complications that are so vividly described. The book also contains information regarding the value of roentgenologic studies and their proper evaluation in diagnosis and management. Analgesia and amnesia are discussed, including the latest information on the use of the new drugs.

In general, the book can be described as perhaps one of the best textbooks of obstetrics in any language, which is the opinion of many of the previous reviewers of this book. It would certainly be a valuable adjunct to any practitioner's library because it discusses in detail the great advances that have been made in obstetrics during the past few years.

CHARLES W. SMITH, M.D.

THE ESSENTIALS OF MODERN SURGERY. By R. M. HANDFIELD-JONES, M.C., M.S., F.R.C.S., and SIR ARTHUR E. PORRITT, K.C.M.G., C.B.E., M.A., M.Ch., F.R.C.S. Baltimore, The Williams and Wilkins Company, ed. 4, 1951. $11.00. Cloth binding. 1,263 pages. 644 illus.

This is another typically British textbook on general surgery. Since it covers almost all of the surgical diseases, each individual condition can only be dealt with in a fleeting manner.

Each condition, in general, is described, using essentially the same format with a brief discussion of the anatomy, physiology and pathology, following which the signs and symptoms are reviewed. The treatment as described may be only one word in length, i.e., for Linitis Plastica the author says: "Treatment is gastrectomy," which one must admit is straightforward and to the point. In other instances, as under the subject of adenoids, over half a page is devoted to treatment.

The illustrations also are typically British. The paper is of good quality and the printing is readable but the binding may not stand hard usage. This book will be useful as a quick reference to the common surgical diseases but will have to be supplemented by other sources of information for more complete analysis of the problems.

A. H. LETTON, M.D.

SURGICAL CARE: A PRACTICAL PHYSIOLOGIC GUIDE. By ROBERT ELMAN, M.D., F.A.C.S., Professor of Clinical Surgery, Washington University School of Medicine; Assistant Surgeon, Barnes Hospital; Associate Surgeon, St. Louis Children's Hospital; Director of Surgical Service, H. G. Phillips Hospital, St. Louis. New York, Appleton-Century-Crofts, Inc., 1951. $8.00. Cloth binding. 586 pages. Illus.

This volume brings a practical guide for the complete care of the patient. Under the guidance and inspiration of our forebears, the art of surgery has evolved from just the performance of an operation into an ever expanding field of preoperative preparation, improved anesthesia, delicate operating technic and a careful, systemic, active postoperative care. Dr. Elman has attempted to cover all of these factors except, of course, the actual operative technic.

After considering the reactions, including psychogenic, to trauma by the body, the author takes up what is probably his most important chapter, "Nutrition in Surgery." Following chapters on "The Physical Factors of Surgery" he comes to "Basic Preoperative Care" and "Anesthesia," which is followed by "Routine Postoperative Care." Chapters 9 through 18 describe postoperative complications. Chapter 19 covers the pathology, clinical picture and therapy of thermal burns.

This volume is well impressed on glossy paper; the style of writing is easy to read and easy to understand. This is a book which every surgeon must have and which every internist who consults on surgical patients should read.

A. H. LETTON, M.D.

SURGICAL PRACTICE OF THE LAHEY CLINIC. By members of the staff of Lahey Clinic, Boston. Philadelphia, W. B. Saunders Company, 1951. 1,014 pages. 784 illus. on 509 figures.

This book is a volume on actual surgical technics. The technic of the sur-

geons of the Lahey Clinic have become quite standardized and the particular specialist in whose field each operation occurs here describes the procedure and also gives, where apropos, other useful information about the subject.

This book follows a similar, earlier edition by 10 years and thus contains many advances in anesthesia and chemotherapy as well as in technic. There have also been many cases added to each series in the last 10 years and the opinion on different conditions is either strengthened or changed as the case may be.

The binding isn't quite up to the standard usually seen in Saunders' books. The paper and printing are excellent and the illustrations are clear and concise.

This book should find a place in all medical libraries for reference by surgeons and house staff.

A. H. LETTON, M.D.

PLASTIC SURGERY OF THE NOSE. By JAMES BARRETT BROWN, M.D., Professor of Clinical Surgery, Washington University School of Medicine, St. Louis; Chief Consultant in Plastic Surgery, U. S. Veterans' Administration, Washington, D. C.; formerly Senior Consultant in Plastic Surgery, U. S. Army and in E. T. O., and Chief of Plastic Surgery, Valley Forge General Hospital; and FRANK McDOWELL, M.D., Assistant Professor of Clinical Surgery, Washington University School of Medicine, St. Louis. The C. V. Mosby Co., 1951. 427 pages. 379 illus. $15.00.

This is the first edition of a new book by two outstanding plastic surgeons who have written other books in this field. It is written in their usual clear and concise style and is intended as a practical guide rather than an encyclopedic compilation.

It is divided into six sections. Section 1 deals with general considerations, including examination of the nose, anesthesia, and instruments. Section 2 describes surgical reduction in the size of the nose. Section 3 deals with building up and straightening the nose and includes the early care of nasal injuries. Section 4 takes up the correction of cleft lip nasal deformities. Section 5 describes repairs which include the grafting of skin and includes types of partial and total nasal reconstruction. Section 6 deals with various other nasal repairs and includes tumors, scars, rare anomalies, and war injuries.

The illustrations are excellent and the book should be well received by specialists in plastic surgery.

JOHN R. LEWIS, JR., M.D.

Books received are acknowledged in this section, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

A HANDBOOK OF SURGERY. By REGINALD C. B. LEDLIE, M.B., B.S. (Lond.), F.R.C.S. (Eng.), Surgeon, The Royal Cancer Hospital, Senior Surgeon, The Miller General Hospital, Senior Surgeon, East Ham Memorial Hospital, Consulting Surgeon, The Manor House Hospital, and MICHAEL HARMER, M.A., M.B., B.Chir. (Cantab.), F.R.C.S. (Eng.), Assistant Surgeon, The Royal Cancer Hospital, Assistant Surgeon, Paddington Green Children's Hospital, Surgeon, St. Mary's Hospital for Women and Children. London, England, Bailliere, Tindall and Cox, 1951. Compliments of The Williams and Wilkins Company. $5.00.

ABSTRACTS FROM CURRENT LITERATURE

SIMPLIFIED PHOTOGRAPHY FOR THE SURGEON. John T. Lloyd. *Journal of the International College of Surgeons* 16:208-212 and facing page (Aug.) 1951.

Lloyd has devised a simplified apparatus for clinical photography particularly adaptable to the use of the busy surgeon. The apparatus employs a 35 mm. roll film camera (Kodak 35) attached to a bar mounting two photofloodlights, and to which may be attached one of several fixed focus frames. It is stated that the combination has the following advantages:

"1. Light, source and distance are constant.

"2. The frame is always in focus.

"3. The apparatus is adaptable to lesions and specimens of various sizes.

"4. The camera settings are constant once the apparatus is standardized.

"5. The apparatus can be kept set up and put in use very quickly.

"6. At the speeds used, the apparatus can be hand held without fear that motion will ruin the picture."

Cadmium plating of the bars and frames of the fixed focus devices permit autoclaving for sterilization. When it is desired to picture structures at the bottom of a wound, the bar may be used without the reticule. For photographing larger parts of the patient, such as the trunk or the entire body, a handle can be fitted to the rod carrying the lights and the whole apparatus hand held.

The material and apparatus used may be easily stored in the ordinary operating room closet.

R. H. S.

ANTETHORACIC JEJUNAL TRANSPLANTATION FOR CONGENITAL ESOPHAGEAL ATRESIA WITH HYPOPLASIA OF THE LOWER ESOPHAGEAL SEGMENT. William P. Longmire. *Surgery, Gynecology, and Obstetrics* 93:310-316 (Sept.) 1951.

Not infrequently, hypoplasia of the lower segment of the esophagus is so pronounced that end to end anastomosis of the esophagus is impossible. Many different types of multiple stage procedures for reconstruction of this anomaly have been described. The literature to date discloses only 1 successful case of transthoracic esophagogastrostomy. In this report, Longmire describes a procedure which he has used successfully in 2 cases, both showing satisfactory function after two year follow-up. The procedure consists essentially of immediate gastrostomy for maintenance and subsequent two stage or three stage bridging of the gap between the cervical esophagus and the stomach with a mobilized independent segment of jejunum. The jejunum is transplanted to the antethoracic subcutaneous space. The operation allows the stomach to remain in the normal position with vagus nerve supply. The principal objection to the procedure would seem to be the obvious external deformity of the redundant subcutaneous jejunum.

The author's summary is quoted:

"Antethoracic esophageal reconstruction was performed in two infants by mobilization and transplantation of a segment of jejunum long enough to extend from the cervical esophagus to the stomach.

"The first operation was performed in three stages and the second in two. Sixteen days intervened between the two stages of the second reconstruction.

"In both cases, function of the reconstructed esophagus has been satisfactory and general development normal in the two year period since completion of the procedure.

"Experience gained from these operations would suggest that the mesenteric vascular supply of the very young infant is sufficiently labile to permit performance of this procedure regularly for the treatment of hypoplasia of the lower esophageal segment.

"Both stages of the antethoracic esophageal reconstruction are well tolerated during early infancy, and satisfactory continuity of the alimentary tract may be established during the first few weeks of life."

R. H. S.